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ISSUED SEMI-MONTHLY

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The Stampede to Nome.

Dispatches from Puget Sound outfitting points bear out all the prophecies of the transportation managers concerning the violence of the rush to Cape Nome this spring. Thousands of eager gold hunters have already embarked for the new El Dorado, and thousands more impatiently await the first available steamer. Every inch of space on all the regular lines has been engaged far ahead, and extra steamers, as well as sailing vessels, are being pressed into service.

We all know, of course, that Cape Nome cannot possibly find profitable room for all these ardent explorers. Thousands of them are inevitably doomed to bitter disappointment, and hundreds of them in all likelihood to financial ruin. As a dispatch in our news columns shows, and as might have been anticipated without such a dispatch, even those fortunate few who get to Nome this summer ahead of the herd will find all the desirable places tenanted for miles around Nome City. Claims can be bought, of course, if one has the needful capital, but more than ordinary care must be used if the buyer would not enmesh himself in a tangle of lawsuits. Some way will doubtless be found in which the great gold crop of Nome can be harvested in an orderly manner; but the prospect is not clear in all respects, and the situation seems to have no exact precedent in previous gold discoveries.

Fortunately, we shall soon know all about the new region. Up to this time the subject has been enveloped in a haze of rumor and tradition, and the truth has been hard to distinguish from idle reports. One authoritative document has just been published by the United States Geological Survey—the "Preliminary Report on the Cape Nome Gold Region." This report is made by Assistant Geologists Frank C. Shrader and Alfred H. Brooks, and embodies the results of their observations made at Nome last fall. Elsewhere in this issue we print extracts from the report.

Calumet and Hecla Prosperity.

Everyone is looking for increased copper production as a consequence of the high price obtainable for the metal, and one's inclination is to look for this additional supply from new sources rather than old mines. In one conspicuous case, however, the enlarged production comes from a well-tried source—the old, reliable Calumet and Hecla. Not much is said about it, but the developments at the new Osceola lode of the Calumet and Hecla are truly remarkable. Five shafts are down, one of them more than 1,000 feet; many levels have been opened up for stoping, and a new mill, to contain six stamps of 500 tons capacity each, is building.

The output of this shaft cannot yet be predicted with accuracy, but good judges look for a production of from twenty-five to thirty tons of copper a day. Whatever the precise figures may prove to be, the chances are that the Calumet and Hecla will do more than any other copper mine in the world, in the next few years, to meet the world-wide demand for the metal. Most mines will somewhat increase their output, but probably no other mine will swell its production so much as the Calumet.

The effect of this enlarged output on the dividend record of the Calumet and Hecla will, of course, depend on the price of copper in the next year or two. If no great decline should ensue, even the princely disbursements of the last two years—$80 and $70 respectively—may be eclipsed. Some stockholders have looked forward to $100 a year on each of their shares, and this is quite within the range of possibility. The highest price ever paid for Calumet and Hecla stock is $895. One thousand dollars a share was at one time freely predicted for it, and it is easy to imagine conditions under which this quotation would rule.

The Mineral Industries in the Export Trade.

The gratifying increase in our foreign trade, of which so much is heard nowadays, extends to almost all lines, but possibly the mineral industries are getting rather more than their due proportion of the good things from over the oceans.

Our immense and growing foreign business in iron and steel will occur to most readers first in this connection. For the first nine months of the fiscal year our exports of iron and steel amounted to 86.9 million dollars, as compared with only 67.2 the year before, and 49.9 the year before that. Even at high prices the foreign demand keeps up with surprising strength, and no material falling off in business yet appears.

In the domain of copper an equally interesting record has been made. Foreign buyers for a long time held aloof, but they had to come to it in time, and now they are cheerfully paying the high prices that the market demands. Our copper exports in the nine months under review amounted to 40.6 million dollars, as compared with only 26.6 the year before, and 23.04 two years ago.

In the case of refined mineral oil the story is the same. Our exports in the nine months were valued at 51 million dollars, as compared with 36.3, and 38.9 in the two preceding years.

Coal Production in 1899.

Edward W. Parker, statistician of the United States Geological Survey, estimates the production of coal in this country last year at 230.8 million long tons. As compared with the output in 1898, this estimate shows an increase of over thirty-four million long tons, or 17.5 per cent. Although sanguine observers have predicted a large production, these figures of Mr. Parker's exceed even the highest estimates heretofore made.

Pennsylvania, of course, holds the first place among the producing states, having 75.6 million tons to her credit; Illinois is second, with 23.4; West Virginia third, with 18.8, and Ohio fourth, with 16.7. Arkansas, Georgia and Idaho were the only states that failed to share in the increased production.

For a number of years an enlarged output of coal has almost invariably been the precursor of a decline in prices, but last year the enormous production was accompanied by an advance in prices. This fortunate and most unusual combination made the total value of the coal product 259.4 million dollars, or one-fifth more than its value in 1898.

Circulation Record Figures.

The Treasury statement for the month of April shows a further increase in the volume of money in circulation, and carries the per capita circulation to the highest point yet recorded—$26.58. As compared with a year ago, gold certificates have increased in amount nearly $165,000,000, and bank notes over $41,000,000. There have been decreases in some items, but the net change in the twelvemonth is an increase of nearly $127,000,000. These statistics will mean different things to different people—and fortunately they means less to most people than they did four years ago.

DESERT POSSIBILITIES: It may not be so always, but at present the deserts of the Southwest are practically useless except for mining purposes. All the more gratifying, therefore, is their promise of increased utility as regards mineral products. Trustworthy advices recently at hand from Needles, Ariz., indicate activity and effective work in the mines about there. On both sides of the Colorado River, for miles above Needles, are mining camps well worth the investigation of operators. The Mojave Desert is now accessible by rail and boat, and its mineral resources hold out numerous opportunities to enterprising prospectors.

Trustworthy Account of the Nome Gold Region.

Production in 1899—Description of Various Placer Deposits—Mineral Veins.

F. C. Shrader and Alfred H. Brooks of Washington City spent several weeks in Nome last fall, and afterward prepared a detailed account of the region which will soon be published as "Senate Document No. 236, 56th Congress." Meanwhile the following digest of the work has been published, by permission of the United States Geological Survey, in the Transactions of the American Institute of Mining Engineers. The paper is especially timely and valuable now, when so much is printed about Nome that is obviously misleading and erroneous.

The gold of the Nome region has, so far, all been obtained from placer-deposits which can be conveniently grouped as gulch-placers, bar-placers, beach-placers, tundra-placers, and bench-placers. During the past season only those of the gulch and beach have been important gold-producers. No facilities were available for exploiting the tundra-deposits, and the benches have not, as yet, been investigated.

The amount of gold produced during the past season cannot be definitely estimated. While there are, as a rule, fairly reliable data, as to the production of the gulches and creeks, the amount taken from the beach can only be roughly approximated. From the best information we could gather, we believe that the production of gold of the entire belt during the season of 1899 approaches $3,000,000.

The coarse gold, as far as present developments show, is largely confined to the creek and gulch diggings, ranging from the size of a pin-head to nuggets weighing several ounces. Two have been found on Anvil creek weighing twenty to twenty-five ounces. Much of this gulch gold is about the size of No. 3 shot, while nuggets from one-half to one ounce are not uncommon. It is probable that much of the fine gold is lost by the more or less primitive method of extraction now in use.

The gold is usually rounded, and often smoothly polished. In color it is rather dull, and somewhat resembles tarnished brass. The nuggets are round and sub-angular, but seldom flat. Small vitreous quartz masses are not unfrequently found attached to the nuggets.

GULCH-PLACERS.

The creek gold usually occurs on, or very near, bed-rock under a thickness of five to eight feet of gravel. In the diggings, the pay-streak is of varying thickness, but the gravel usually carries some gold, or at least "good colors," from the surface down. The flood-plain or gravel deposits of the stream in or beneath which the gold occurs, measured from rim-rock to rim-rock, varies from twenty to several hundred feet in width on different creeks. A cross-section of the gravel at any given point would show the gold not evenly distributed, but more or less gathered into zones. This pay-streak trends parallel with the creek valley. It is not necessarily continuous, but often occurs in detached pockets which are sometimes very rich.

The gravels occuring with these placers vary from medium size to fine, and are usually poorly assorted, with indistinct stratification. In the area examined by us on Anvil and Glacier creeks, the pebbles were chiefly limestone and mica schist with much calcite and quartz of vein origin. All of these were frequently found to be highly mineralized. In washing the gravels of the gulches and the creeks, much ruby sand and black sand is obtained. The former is chiefly garnet and the latter magnetite. These minerals having a high specific gravity are concentrated with the gold in the pay-streaks.

BAR-PLACERS.

In the lower reaches of the Snake river, and of the other large streams, gold is reported to occur on the bars, also in apparently workable quantity. It is here much finer than in the creeks and gulches, but not so reduced as that in the beach. So far as we learned it is variously mingled with the gravels and the sand constituting the bars, and, like them, was deposited by the rivers and streams which brought the material down from the creeks and gulches. It was on the bars of Snake river that the Nome gold was first discovered.

A GOLD CARGO FROM THE KLONDIKE.

BEACH-PLACERS.

Normally in the beach-deposits there is fine gold, gold-sand, and some flake-gold. The particles are much rolled and flattened, and range in size from that of a small pin-head to dust or flour gold. With only the crude appliances for separation at hand during the past season little of the flour gold has as yet been saved. Small nuggets amounting to about $1.50 in value have been found, but are relatively rare.

The beach-gold, when separated, is bright in color, having much the appearance of fresh brass or gold filings, and is usually of uniform grain. It is of irregular shape, usually flattened with rounded surfaces, and bears evidence of the grinding action of the surf which reduced it to its present fine state.

This beach gold occurs in the beach-placers, a strip of comparatively fine gravels and sand, 100 to 150 yards wide, extending parallel to the shore between the frontal edge of the tundra and the water-line. In the Nome region it has been found in the beach from a point a mile east of the town westward for some ten or twelve miles. Beach deposits were also reported from other localities along the southern margin of the Seward Peninsula.

The richest pay-streak of the beach-deposits usually lies on what is locally called "bed-rock." This is a tenacious clay of varying consistency. It is normally blue in color, but is often stained yellow by iron, frequently contains some carbonaceous matter and some sandy matter. The clay varies in depth from a few inches at the edge of the tundra to six or eight feet near the water line. It seems to be a bed which dips gently toward the sea. It should be noted, however, that it was not definitely determined that this bed-rock is in all cases the same stratum of clay, for such clay-beds are likely to occur anywhere in the gravels.

The strata above the clay-beds consist of well stratified ruby sand, black sand, fine gravels and sands, with occasional layers of shingle. The pebbles are of the rock types which have been described, as well as of calcite and quartz. As in the case of the pebbles of the gulch gravels, these frequently show some mineralization.

The gold lying on the clay "bed-rock" is not evenly distributed, but occurs in more or less concentrated patches. The thickness of the pay-streak is a variant of the methods used in extracting the gold. With the crude methods employed by many of the miners only the richest portion of the pay-streaks are worth working. This includes, in some instances, only the scrapings of the upper surface of the clay-bed; in others, several inches of the overlapping gravels. The pay-streaks vary in width from a foot to several yards; can often be traced in more or less disconnected patches from near the tundra to low tide; and their longer axes seem to lie at right angles to the shore-line. This trend is probably ascribable to the concentrating action of the waves and possibly to the tide when the gold was deposited. The gold has been found from the grass roots of the tundra to low tide. There is a strong probability that this deposit extends seaward, but as yet we have no decisive evidence on this point.

The richness of the beach-placers is very variable. Nearly all the beach-sand carries some colors, and we have seen as much as one dollar to the pan obtained from the pay-streaks in several localities. As above described, the richest pay-streaks of the beach lie on or close to the clay-beds. Another mode of occurrence is in the thin layers of ruby sand and black sand which occur interstratified along with the beach gravels. The position of such layers, which rarely exceed two in number in any given section, is usually toward the base of the section. The pay-dirt from the ruby sand layers consists chiefly of fine garnets and magnetites, with a few vitreous and rose-quartz grains.

TUNDRA-PLACERS.

As has already been stated, the coastal plain or tundra is underlain by gravels similar in character to those of the gulches and the beach. There is every reason to believe that these gravels are gold-bearing, though they have as yet received but little attention from the prospectors. As we have already noted, "pay-dirt" has been found a few inches below the surface at the edge of the tundra near Nome. This is the only fact in regard to gold in the tundra which we could verify by personal observation.

Underneath the dense and spongy growth of moss and grass is a layer of dark brown or black

peat, varying from two to twenty inches in thickness. This peat is usually of a coarse fibrous character, and is formed principally from moss and grass by vegetable decay. Below the peat a layer of blue tenacious clay about a foot in thickness is usually found. This rests upon stratified sands and gravels, and includes considerable white sand, similar to that of the beach. There are also a few thin layers of ruby sand and black sand, occurring at irregular intervals, that often carry gold in commercial quantities. These are usually found resting upon a blue or yellowish clay of a tough impervious character, which is often termed bed-rock by the miners.

The hard or true bed-rock is reported to be a soft sandstone or mica-schist. These lithologic terms are used rather loosely by the average miner, and we believe that the same bed-rock series exposed in the gulches underlies the gravels of the tundra. Where this bed-rock has been reached, it is usually at a depth of from twenty to forty feet. It must not be inferred that this is a measure of the average thickness of the tundra gravels, as the test-pits from which data were obtained were too few in number. It is not impossible that the tundra gravels may, in many localities, exceed 100 feet in thickness. While no systematic prospecting of the tundra gravels has yet been undertaken, some test-pits have been sunk which have shown very favorable indications of gold. The localities of these test-pits are all within a few miles of Nome; and they have yielded from 1½ cents to 35 cents to the pan.

BENCH-PLACERS.

The bench-placers of the region have, as far as we know, received little or no attention from the prospectors. Some of the low benches near the creeks have been shown to yield gold; but the higher benches and terraces have been disregarded, chiefly, it seems, because of the difficulties in obtaining water. As has been explained, these benches and terraces have a similar origin to that of the tundra-plain, and as their material has a similar source, they are likely to contain gold. Whether this gold is sufficiently concentrated to prove of commercial value is a question for the prospectors to settle. A good number of bench-claims have been staked; and it is to be hoped that the assessment work of this year will throw more light on this subject.

VEINS.

In a new region, like that of Nome, the prospector naturally turns first to the deposits which will yield immediate profit, and therefore vein or quartz mining receives but little attention. In the arctic region, moreover, prospecting for mineral veins is much impeded by the thick coating of moss which covers most of the surface of the country. We have, therefore, but little definite information in regard to mineral veins of the region.

In the discussion of the geology, we noted that the limestones and mica schists contain many quartz and calcite veins which are frequently mineralized. We observed both copper and iron pyrites in these veins, and we have it on good authority that gold-bearing quartz veins have been found in the region. The placer-gold, as we have noted frequently, has small grains of quartz attached to it. In the beach gravels, rounded fragments of ore are occasionally found, consisting chiefly of copper and iron pyrites. One of these (assayed by E. E. Burlingame of Denver, Colorado) yielded 0.12 ounces of gold, with a trace of silver, to the ton.

As far as it goes, the evidence points to a derivation of the gold from the mineralized veins and country-rock above described. We wish to emphasize this, because of the popular idea that the Nome placer gold has been brought from great distances by the action of ice or through some convenient convulsion of nature.

The Art of Drilling.

Western Pennsylvania the World's Schoolmaster—Stationary Rigs Expensive—Expanding Uses of Portable Drilling Machines.

Modern ingenuity has made it possible to explore the crust of the earth to great depths at comparatively small expense. The earth is full of riches, in spots, and the advent of a cheap and ready means of locating the deposits of mineral wealth is a public benefit. By means of the drill, oil was discovered in Pennsylvania in 1859, and since that time more than 25,000 wells have been drilled in that vicinity, some of them almost a mile deep.

Under the stimulus of the vast wealth, in the shape of petroleum and gas, found in western Pennsylvania, some of the most skilled mechanics the world ever produced were drawn to that section. From the light, primitive wooden rods operated by hand power, the heavy cable tools operated by steam have been gradually evolved. Workmen educated there have gone to all parts of the world to operate, and it can be truthfully said that western Pennsylvania has schooled the world in the art of drilling.

As a rule, the deeper the wells to be drilled, the heavier the tools and machinery required to do the work. For wells over 1,500 or 1,600 feet deep the derrick, machinery, and tools required are necessarily so heavy that they cannot be made portable. For each well a derrick is built, an engine and boiler placed near the well and housed in. Such an outfit is called a stationary rig, and the building and placing of it often costs as much as the drilling of the well. But for wells of 1,500 feet or less, it is possible to combine the machinery upon sills mounted on wheels in such a way that the outfit can be moved in its entirety, and set up in an hour or two. The engine used for drilling is also used for moving the machine itself from place to place.

These portable machines are made in several sizes and capacities and are used for many purposes. The larger sizes are, of course, used mostly for drilling oil and gas wells; the medium sizes for drilling for artesian water, and the smaller sizes for ordinary water wells. Recently these smaller sizes have been adapted to exploring for various minerals, such as lead, zinc, coal, and iron. They have also been successfully applied to prospecting dredging ground—river bottoms and channels, lake beds, and the like. When used where there is water enough, the machine is loaded on a flat boat, with all appliances and a six or eight-inch pipe is driven into the sand and gravel to any depth required. The materials are extracted from the inside of the pipe by specially designed tools which take up the area of the pipe with exactness and certainty. The materials taken up are assayed and the value of the ground determined to within two or three per cent. When the test has been made to bed-rock, the process used for driving the pipe is reversed, and the pipe is withdrawn and used over and over again. The presence of water, so far from being a hindrance to such operations, is rather an advantage.

A PORTABLE DRILLING MACHINE.

After the ground has been assayed, so to speak, and a dredge installed, a system of tests can be made for the purpose of mapping out the pay streaks of old channels or bars, thus saving the expense of moving material in which there is no pay. And in case cemented gravel or nests of boulders are found, the machine may be used for inserting dynamite cartridges in such places as need it. The machines are so arranged that wood saws may be attached for cutting fuel, and if desired they can be used for sinking shafts; using

the tool hoist for taking out the materials excavated, and at the same time using the beams for operating a sinking pump. It is a credit to American ingenuity that a great number of these placer-testing outfits have been exported to New Zealand, South America, China, and Siberia.

The accompanying illustration shows one of the machines in operation testing placer ground near Breckenridge, Colo.

Some Deep Holes.

(Written for the Journal by a Low-Minded, Frivolous Miner.)

The deepest shaft in the world is the Red Jacket, of the Calumet and Hecla copper mine. This big hole makes a bee line for the center of the earth, and falls short of reaching it by only 3,900 miles. Finding the climate sufficiently tropical at a depth of 4,900 feet, the sinkers of the Red Jacket shaft stopped there; and it is said that the company will not go lower as all the ore in that part of the property can be obtained from that level.

Only a mile away a shaft is going down into the bowels of the earth that will wrest from the Calumet and Hecla the championship of the world in this respect. It is, on the face of it, a deep-laid scheme to undermine Red Jacket's fame. Number 5 Tamarack is the guilty shaft capable of these underground methods. Begun five years ago, and due at the bottom next year, this hole in the ground will form the first section of an air-line route to China. (Come to think of it, though, it will not be exactly an air-line, will it?) Just how far the through cars will take travelers before they have to get out and walk has not yet been determined, but it will be more than 4,900 feet, anyway.

It is easier to bore a hole into 8,000 miles of rock than it is to carve out a big shaft through the same, and greater depths than those mentioned have been attained by mere wells. The deepest penetration of this kind in America occurs in the valley of the Monongahela River, not far from Pittsburg, where an oil-driller, who believes in going deeply into his subject, has gone down 5,600 feet from the surface. He means to descend 6,000 feet, and slake his thirst for petroleum at that level.

If he stops, there, however, as seems to be contemplated, the American reputation for superlatives will suffer a setback, as there exist in Europe at least two borings deeper than 6,000 feet. In the coal fields of Upper Silesia, in the little mining town of Paruschowitz (to be pronounced in one spasm), the diamond drill has wormed its way down through fire and water to the record depth of 6,570 feet. Another drill, near Leipsic, got down 6,265 feet before it lost its breath. These two borings were sunk to guage the thickness of the coal measures, and to ascertain whether other beds underlay those that were known. The work was done by the paternal German government at its own expense.

It has been proposed to operate gold mines in the Transvaal to a depth of 10,000 feet, with a vertical shaft working 6,000 feet down by a surface installation, while the remaining 4,000 feet would be provided for by another installation underground. As the temperature is estimated to increase one degree Fahrenheit for every 203 feet of descent, there is an obvious limit to these ambitions.

BRITISH COLUMBIA COPPER: J. F. Tischener, a director of this company, says that the mine is now down 400 feet in the second crosscut of sixty-five feet. The ore continues to average between four per cent and five per cent copper and about $4 in gold. Material for the smelter has been shipped and will be in position before August.

Mining Prospects in the Philippines.

A Montana Volunteer, who was a practical miner before he became a soldier, and who remained in the Philippines after his regiment had returned home, has written to Helena friends an interesting letter about the mining possibilities of the Philippine island. Writing from Manila, he says:

At present there are in this city about 200 ex-soldiers, from Western states in America, nearly all experienced miners, anxiously awaiting the necessary permission from military headquarters to rush into the rich placer mining country which lies north and east of here, but which permission is now withheld owing to the lack of definite information on the part of the Government as to the exact interpretation of the mining laws governing these islands. These laws are now undergoing at Manila translation by several Spanish-American translaters, whose task will, it is believed, be completed shortly. It is known, however, that the law permits prospecting for minerals anywhere. No license or other formality is required to placer mine unless the output exceeds 2,000 tons a day and buildings for working are erected. Any one is free to work placers anywhere at no expense save his own labor. Placer claims contain 60,000 square Spanish yards, equivalent to about 950 feet long by 625 feet wide. Quartz claims are of the same dimensions. The apex of quartz veins may be followed into any other land underground, provided no wall is broken.

The richest known deposits in Luzon are found about seventy-five miles northeast of here, where there is abundant water for sluicing and hydraulic mining and saw mills. This section is inhabited largely by Igorrotes, who are very friendly to Americans, but extremely hostile toward the Filipinos and Spaniards, not infrequently killing them for slight offences. Miners can live quite comfortably on food purchased from the Igorrotes at from $2 to $4 a week.

There is absolutely no reason to doubt that the placer mines of Luzon and Mindanao islands, as well as some parts of Cebu, are among the richest in the world, easy of access and no hardships to be encountered in reaching them as soon as the military authorities permit miners to enter them. Quartz mining is absolutely undeveloped in Luzon, but very rich specimens, secured near here, of white quartz carrying free milling have been brought in. The veins are not well defined, however, the tendency inclining toward pockets, from one of which ore assaying unusually high in gold and copper was secured. The copper runs in porphyritic quartz in a decomposed state mixed with iron oxides carrying free gold and copper pyrites.

The native women hereabouts pan the alluvial sands with wooden bowls, frequently taking out from $3 to $5 a day, gold. Philippine gold runs about $14 an ounce. Last week an Igorrote woman brought into Dagupan, as a result of six weeks' panning, seven pounds of gold nuggets, and two ex-soldiers, who mined in the same district for three months, netted over $5,000 in gold, using pans and sluice boxes, and would have done even better had not the soldiers compelled them to leave.

The rivers are lined with banks of black sand (magnetic iron), carrying fine gold. The gold is not flaky but small, rough nuggets from the size of a pin head to three or four ounces in weight. Bed rock averages from six inches to twenty feet and the reason why no systematic work has ever been done in these fields is because the Igorrotes drive out the Spaniards while the Spanish government has never allowed the Chinese and Filipinos to pursue mining as a business, hence the whole field is new and wonderfully rich.

Lead ore is also abundant and runs from twelve to sixty per cent to the ton, but has never been mined to any great extent. Copper runs from fifteen to eighty per cent. Little or no silver has been found although no systematic prospecting therefor has been done. Iron is found in abundant quantities near Manila, but the production thereof is small from the fact that the Spanish government never encouraged mining. Angat yielding as high as eighty-five per cent is mined in a primitive manner in this island as is also a good grade of marble, which is found in large quantities in Bataan province. Coal is also abundant, especially in Cebu. Very rich gold deposits exist on the coast of Surigao, northeast Mindanao.

The ex-California and Montana soldiers are unanimous in the belief that when opened up, the mining fields of Luzon will be the most inviting and remunerative in the world, not excepting even Nome and the Klondike.

Growth of the Iron Industry in the United States.

The United States Passes Great Britain in 1890—Eastern Pennsylvania Yields to Western as Chief Producing Region—Lake Superior Ores and Transportation Marvels Facilitate Astounding Growth—Advantages of Unified Management.

BY PROF. F. W. TAUSSIG.

For the current number of the Quarterly Journal of Economics, the scholarly review issued by the Harvard University Department of Political Science, Prof. Taussig has written an admirable account of the progress of the iron industry in this country. An abstract of the article follows:

Thirty years ago, Great Britain was still the world's commanding producer of iron and steel. But between 1860 and 1870, the product in the United States had doubled, and for three decades, the geometrical progression was maintained, for 1880 doubled 1870, and 1890 again doubled 1880. The iron industry of Great Britain held its own, but could not match the astounding pace of its young rival. In 1890 the United States turned out over 9,000,000 tons of pig iron, for the first time passing Great Britain, and displacing that country as the leading producer. The depression which followed the crisis of 1893 caused a sharp decline in the American product, but with the revival of activity after 1896, the figures again mounted, reaching nearly 12 millions in 1898, and 14 millions in 1899. The year 1900 will hardly show a repetition of the feats of the previous decades—the pace of the geometrical progression is too killing to be maintained—yet all present indications are that the close of the decade will show an output beyond the dreams of even five years ago. This enormous increase, however, has been by no means evenly distributed over the United States. A revolution within the country has taken place which is part and parcel of the changed relation to other countries, and must be followed before the latter can be understood.

THE ERA OF ANTHRACITE IRON.

The first great impulse to the production of crude iron on a large scale came in the United States with the successful use of anthracite coal as fuel. From 1840 to 1860 the site of the industry and its growth were governed by this fuel. Hence Eastern Pennsylvania was the main producing district; the supplies of ore near this region were smelted with its anthracite coal, and Philadelphia was the central market. Proximity to the seaboard made foreign competition easy. For some time after the Civil War this dominant position of anthracite iron was maintained. But the use of soft coal which had begun before 1860, became rapidly greater, the use of anthracite began to sink, and the production of iron with anthracite coal has now shrunk to insignificant dimensions. What is classed as "anthracite iron" is smelted with a mixture of coke and hard coal, and even this means of reducing the ore has come to be of less and less importance. Virtually, anthracite has been displaced as an iron-making fuel. Coke has proved, ton for ton, a better fuel than anthracite; and the supplies of bituminous coal available for coking are virtually limitless, and the processes of coking have been applied on a huge scale and with tireless energy.

Pittsburg is situated in the heart of the region where coking coal is plentiful. To this point the iron industry has converged, attracted first by cheap fuel, and soon by other geographical advantages of the region—its easy access to the growing western country, and the added opportunities of securing superabundant quantities of the best ore. Pennsylvania has remained the greatest iron-producing state in the Union, but since 1880 it has been western instead of eastern Pennsylvania which has secured to the state its leading position. This westward movement has been no less affected by the distribution of the ore supply; and the effect of this in turn rested on the revolution wrought in the iron trade by the Bessemer process. The Bessemer process depends for its availability on special kinds of ore and pig iron, such as are well-nigh free from sulphur, and especially from phosphorus. Variants of the process, free from this limitation have, indeed, been applied on a great scale, but the original Bessemer process remains the most effective and economical. Ores adapted to it have become doubly valuable, and the earth has been scoured to obtain them. The deposits of Great Britain contained important supplies, yet not in quantity adequate to the new demand. In the United States, also,

some of the sources previously used proved to be available, but the greater part of the eastern ores were not so, and, as in Great Britain, a distant source of supply was turned to.

FOUR IMMENSE ORE FIELDS

The Lake Superior iron region suddenly sprang into commanding place. Here were abundant supplies of rich and properly constituted ore. These and the equally abundant coal of Pennsylvania were brought together; the iron made from them was converted into steel by the Bessemer process, and thus only became possible the astounding growth in the production of iron and steel in the United States. The great Bessemer ore fields of Lake Superior are four in number—the Marquette, the Gogebic, and the neighboring Vermillion and Mesabi. The Marquette was the first to be worked on a great scale. The Gogebic began to be worked in 1884, and about the same time the Vermillion began to be developed. But along the Mesabi range of hills, vast tracts of rich iron ore, finely comminuted and easily worked, lie close to the surface. The Mesabi field at once sprang into the front rank among all the iron ore fields of the world. Ten years ago, the region was a trackless waste; in 1892 it was opened by railway; in 1893, virtually the first year of production, 600,000 tons were shipped from it; in 1894, thrice that amount, and in 1895 it became what it has since remained—the most productive of the iron-mining districts. A little less than half the ore is of Bessemer grade; were it all of the prized Bessemer quality, and in the best form, the other fields might be entirely displaced. For many years, the Lake Superior mines have been the main sources of supply of the American iron industry. More than half the total supply has come from here, and the Bessemer supply—by far the most effective and significant part of the total—has come mainly from this region.

DISTANCE ANNIHILATED.

The iron-producing region which depends on the Lake Superior ores stretches over a wide district, the extreme ends being separated more than 1,000 miles. The coal region itself—western Pennsylvania and adjacent parts of Ohio—remain the heart and center of the iron industry. Whether the ore goes to the coal, or the coal meets the ore half way, one or both must travel a long journey by land as well as by water. One or both must be laden and unladen several times, and a carriage of 800 to over 1,000 miles must be achieved, with two separate hauls by rail. Here are supplies of the two materials separated by 1,000 miles of land and water and combined for iron-making on the largest scale known in the world's history. The history of the American iron trade in the last thirty years is thus, in no small part, a history of transportation. The cheap carriage of the ore and coal has been the indispensable condition of the smelting of the one by the other. The perfecting of transportation has been almost the most remarkable of the mechanical triumphs of the United States.

Still another factor has been at work—the march of production to a greater and greater scale, and the combination of connected industries into great single managed systems. The great iron and steel companies operate iron mines on Lake Superior, coal mines and coke establishments in Pennsylvania, docks and railways, as well as iron and steel works proper. The economy arising from such widely-ramifying organizations is not merely or chiefly in dispensing with the services and saving the gains of so many middlemen; it arises mainly from consistent planning of every stage, the nice intercalation of operations, the sweeping introduction from end to end of rapid-working machinery, continuously supplied under homogeneous administration with the huge quantities of material which alone make possible effective and economical utilizations of the great plant.

THE LABOR SITUATION.

The labor situation and the trades-union movement have had their influence. But the power of the labor unions among the ironworkers has been less in the United States than in Great Britain, and the American iron and steel master has felt more free than his British rival to push on with new processes, to remodel his organization, and to readjust his labor force.

One other social aspect in the growth of the iron industry deserves attention. The dominant position of the Pittsburg coal district has been repeatedly referred to. For the iron trade the most important section of that district is the famed Connellsville coke region. Here is a level and uniform outcrop of the best coking coal, and from this has come the greater part of the coke used in smelting the ores. Fuel has been turned out for the American ironmaster at prices lower than those paid by his rivals in any part of the world, while low rates of transportation have enabled the cheap fuel to be carried to furnaces near and distant without the loss of this cardinal advantage. The nature of the operations caused cheapness to be attained, to no small extent, by cheap labor. The coal mines have drawn to themselves the lowest and poorest kinds of manual labor. Multitudes of immigrants—Italians, Bohemians, Hungarians Poles, and what not—have here found employment such as they could at once turn to. At the iron mines, the conditions seem to have favored the better mode of securing cheapness—vigorous and intelligent labor using highly elaborated machinery.

A Slow Speed Roller Mill.

High speed roller mills have been heretofore, and are now by many considered, the only feasible devices for crushing quartz and ores for the purpose of extracting the values therefrom. The reasons for this are plain: There have been no mills manufactured so cheaply and constructed so light as to admit of running them slowly, even could they do the amount of work that would be expected of them. "Crowd all of the ore into the mill that you can, and sacrifice the close extraction," has been the desire of those operating roller mills. This was necessary, for heavy and expensive machinery requires tremendous power and would not otherwise pay good interest on the money invested.

The Lane Slow Speed Roller mill is now perfected and in successful operation, doing the work of the high speed mill at a much less cost for operation and installation. The mill is principally constructed of wood, and its weight or crushing perquisities are added where the mill is erected in the shape of waste or valueless ore placed in the receptacle for that purpose. The power is applied to its outermost periphery by a series of cogs fastened around the entire circumference. The crushing rolls, or wheels, are constructed of wood encircled by a heavy band of iron or steel, a shell three inches thick with a five-inch face. The hub of the wheel is made of the same material and is roller and ball bearing. The wheels do not exceed 800 pounds in weight and the tires are easily replaced, if that operation ever becomes necessary. The axle upon which the rollers revolve is so constructed as to admit of the adjustment for grinding as well as rolling. By a simple attachment the axle is moved from its natural position and a lagging tendency is given to the wheel, causing it to grind upon the bed-plates or track.

There is no heavy timbering needed in erecting this mill; it is self-contained, and an important item in the transportation is thus eliminated.

A question often asked is whether two slow-speed mills be built that will cost no more than one high-speed mill, and that will put through the same quantity of ore, at the same cost, and gain in doing better work? That this can be done, has been demonstrated by the Lane Slow Speed Mill. Its capacity is ten or twelve tons a day, depending upon the fineness to which the ore is crushed, the hardness of the ore and the weight carried upon the mill. One of these mills will cost less than a five-stamp mill, the capacity will be equal, and the amalgamation accomplished will be superior, it is claimed, to that of an arrastra, which is by many considered the best method employed heretofore, though primitive in design.

The weight of the mill, including foundation timbers and cog connections, is 9,175 pounds. The largest timber used is eight by eight inches, ten feet long. The heaviest castings are the tires or shells of the rolls, which weigh 550 pounds each.

The following letter from Messrs. Thomson and Boyle is self-explanatory:

We call your attention to extracts from the report of George H. Bradford, superintendent of the Slate Range Milling Co., whom we know to be reliable and trustworthy. From this and other reports, and after a careful examination of the merits of the Slow Speed Roller Mill, we have made arrangements, as sole agents, to manufacture and sell the same. We believe it to be the mill that miners and mine owners need, and that it is a mill that will leave a less percentage of gold in the tailings than any of the high-speed mills now in use.

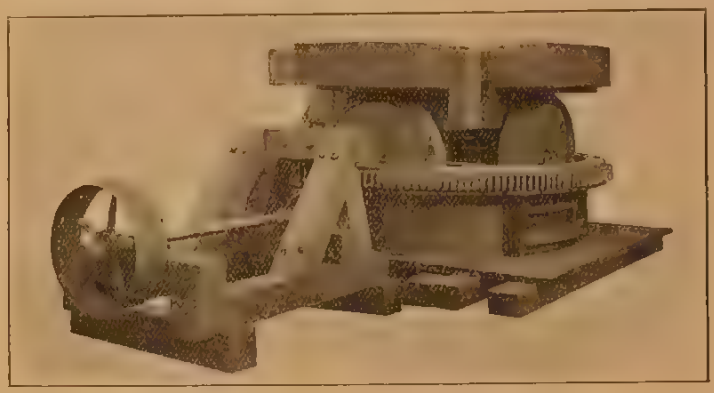
We are making arrangements to build in Los Angeles, one of these mills, with a concentrator and cyanide plant. You will then be enabled to work and test your ores and determine the best mode of treatment. We will be pleased to have you send one-half of your ores to high speed mills and send us the other half and give the Thomson & Boyle Reduction Works a fair and impartial trial.

We manufacture an improved cyanide plant, and if you need anything in that line we will be pleased to correspond with you.

Respectfully yours,

Thomson & Boyle Co.

Mr. Bradford says in his report: Our mill complete ready for ore cost about two-thirds the price of a five-stamp plant. Our capacity at twelve revolutions per minute is 1,000 lbs. ore crushed per hour. We use a No. 10 iron wire screen. A ten-oz sample of the tailings gave the following screen test: 99.25 per cent passed through a forty-mesh brass wire screen, 88 per cent passed a sixty-screen, 84 per cent passed an eighty-screen, and 37.5 per cent passed a one-hundred-screen. A mill that will crush 84 per cent of its product through an eighty-mesh screen, using a No. 10 mesh, is something new in milling. We are using a Wilfley concentrator. The tailings assayed 93 cents to $1.37 per ton. The screen test of the tailings shows this to be a most perfect sizing mill for concentration, such as cannot be obtained from any stamp mill, or high speed roller mill, that I have ever seen. Our concentrates are about $240 per ton. We only use about two-thirds the water required for a five-stamp battery. The mill alone with feeder takes four or five HP. The ores here are not hard, yet are by no means considered soft, being almost pure quartz. The gold is very fine. We milled some ore carrying about four per cent galena, also manganese, iron and copper pyrites, silver and a little fine gold, and caught 90 per cent of the gold in the battery. The tailings ran less than $1.25.



THE LANE SLOW SPEED ROLLER MILL

Summer Study of Mining.

The Columbia School of Mines has completed arrangements for its summer class in practical mining. Professor Robert Peele will conduct the class and will work with the students at the mines in the Cripple Creek district of Colorado. The class will leave New York early in June and will spend five weeks in underground work in the mines, followed by two weeks in field geology under Dr. Hollick of the department of geology. The larger metallurgical works in the Cripple Creek district will also be visited.

American Metal Mining.

Miners are Productive Workers in an Emphatic Sense—Our Marvelous Crop of Metals—Fifty-five Products, Increasingly Useful—Distinctive Mineral Colors.

By Theo. F. Van Wagenen, E. M.

Some one who has looked closely into the history of nations, has declared that those which have been large producers of metals have been on the whole more prosperous than those which have been devoted mainly to agriculture or manufactures. Whether there is complete truth in this observation or not, the following propositions seem self-evident:

First—That the food crop, as well as the coal and petroleum crops of a country, disappear annually about as fast as they are produced.

Second—That the textile crop—cotton and wool—suffers as complete destruction in from two to five years from the time it appears on the market.

Third—That most of the base metal crop is good for ten to twenty years of service at least, and often more; and that the noble metal crop (gold, silver, platinum, iridium), except such small portions as are used in dentistry, photography, gilding, etc., has an indefinite life, which is certainly a long one because of their great value. And, finally, when any are manufactured into coin, they constitute the one article possessed by man, which, through passing continually from one ownership to another, always maintains its initial worth, representing the same exchange value to both buyer and seller in each successive transaction.

Wealth is the raw material of nature plus the labor that has put it in a form adapted to the use of man. Probably that kind of wealth is most valuable which will remain longest in service, and requires to be replaced less often; and the community which produces the most enduring kind of wealth (other conditions being equal) should stand an excellent chance of prospering above less favored ones.

OUR MAGNIFICENT MINERAL OUTPUT.

It is not generally known what a marvelous crop of metals is produced each year from the territory of the United States. The following is the record for 1899, and it is one of which every American may well be proud:

Metal.	Tons (2,000 lbs.)	Values—Approximate, per ton.	Total.
Iron	15,400,270	$8.00	$123,084,160
Copper	296,337	347.00	102,828,939
Gold	120	602,922 00	72,350,610
Silver	2,097	17,500.00	36,397,500
Lead	213,000	90.00	19,170,000
Zinc	136,000	115.00	15,640,000
Aluminum	3,250	620 00	2,015,000
Quicksilver	1,077	1,280 00	1,378,560
Antimony	1,000	130 00	130 000
Nickel	12	800 00	9 600
Platinum	(300 oz.)	473 072 00	3,837
Iridium	(8½ oz.)	771,249.00	225
Total			$374,278,461

In addition, about $13,000,000 worth of ferro-manganese, $245,000 worth of tungsten, $215,000 worth of molybdenum, and about $15,000 worth of ferro-molybdenum were produced, making altogether nearly $387,763,461 worth of metals for 1899.

NEW USES FOR METALS.

The metals have always been attractive substances to men. The ancients knew of but seven—gold, silver, tin, mercury, copper, lead and iron. Fifty-five are known at the present time, but only a few more than the original seven—such as aluminum, antimony, arsenic, bismuth, cadmium, platinum, nickel and zinc are common with us, the balance are known only to the manufacturers of certain specialties, or to the scientists. Many are never seen outside of the laboratory, or museum, yet one after another, as their inherent qualities become known, are being dragged from obscurity into the service of civilization. Thus chromium, manganese, molybdenum, titanium and tungsten are now standard materials in steel manufacture, each one producing some quality or property in the latter which fits it for a particular service. Calcium, magnesium and lithium, which are the light-weight metals in the same class as aluminum, are already on the market largely for scientific purposes; barium, in the well known guise of barytes, is very extensively used as an adulterant in the manufacture of white lead. Cobalt, uranium and vanadium are in growing demand in the manufacture of glassware and pottery on account of their coloring properties. Selenium, which is electrically sensitive to the action of light, has been the subject of experiment for some years with the idea of using this property in the transmission of pictures by wire, and in auto-telegraphy. Iridium and osmium, being very hard and resisting the corrosive action of inks, are used to point gold pens. Palladium, which takes a brilliant polish, and upon whose surface lines of marvelous fineness may be traced, is peculiarly adapted for the arms of delicate balances and for graduated scales for all scientific instruments. And when one of the rare metals is found to be serviceable in some necessary way, it is curious to note how comparatively abundant it becomes in a short time. Judging by the past, it is to be expected that as fast as any develop properties that will prove serviceable and generally useful, even the rarest will quickly become common.

GENERAL CHARACTERISTICS OF METALS.

The essential and invariable quality that distinguishes the metals from the other elementary bodies is that of electro-positivism. Aside from this they are usually good conductors of heat and electricity and have the property called metallic lustre. The familiar ones (and in fact all but two) are more or less malleable and ductile. Most all of them when pure, are white or grayish white. The well known exceptions are copper and gold. Titanium is quite red. Indium is quite blue. Each has a tint of its own. Few would recognize chemically pure iron, so different is its white color from the usual concept of the metal. The blueish tint of lead and zinc are well known, and the yellowish shade of nickel, and there is no difficulty in distinguishing between the soft white of silver and the gaudy white of tin; but there are few except the chemists who would recognize the lustrous sheen of pure molybdenum, or the lemon-yellow gleam of that curious metal rubidium, which at ordinary temperatures is so nearly a fluid that it can be molded like wax.

The foregoing extract is taken from the introduction to a little monograph on "Gold," written by Theo. F. Van Wagenen, of Denver, Colo. This well-known mining engineer has written a series of these monographs, one on each of the important metals. As might be expected from the professional standing of the author, these little books are thoroughly trustworthy as to statements of fact, and they are in addition interesting, instructive, and remarkably comprehensive. They are sold for 15 cents each only, but are worth far more to anyone interested in the mineral industries.—Editor Mining and Metallurgical Journal.

Petroleum in California.

Failure at First—Structural Geology Must Be Studied—A Forest of Derricks Invades a Residential District—California Petroleum Different from Eastern.

By W. L. Watts.

The existence of petroleum in California has been known for many years. From time immemorial the California Indians used this material, in the form of asphaltum, for various purposes. In the early history of the State the Catholic fathers utilized it for roofing their missions and other buildings.

It is said that in 1855 or 1856 Andreas Pico distilled petroleum on a small scale for the San Fernando Mission. He obtained his crude oil form Pico cañon, near Newhall, in Los Angeles county; and he was probably the first refiner of petroleum in this State. In 1856 a company commenced work at the La Brea ranch, in Los Angeles county, and tried to refine the crude oil. In 1857 an attempt was made to produce illuminating oil from crude petroleum at Carpenteria, in Santa Barbara county; and there are records of similar attempts in other localities previous to 1860, but none of them were successful. The pioneer distillers appear to have expected that by the fractional distillation of California petroleum they would obtain similar products to those resulting from the fractional distillation of the petroleum found in the Eastern States, but they were disappointed.

The California petroleum is found in formations which range from the Lower Cretaceous to the Quaternary, the greater portion being in the Eocene and the Neocone formations. In this State it is imperative that oil-mining operations should be governed by a careful study of the structural geology of the locality in which they are conducted; for wherever petroleum has been found in California, geological disturbance has complicated the stratigraphic conditions.

To those who explore the hills and mountains of the coast range there are few things more interesting than the curiously folded condition of the rocky strata. In California the student of structural geology has not to search very far before he finds natural illustrations of the types of folds he has seen in his text-books. In some parts of the world such folds are many miles in breadth, but in the Coast range the conspicuous folds are generally narrow ones. The small and conspicuous folds usually constitute portions of larger folds, which, although they are more important than the small folds in the formation of hills and mountains, are not so easily detected, unless a large area is carefully mapped out and studied. The small folds are, however, of great importance in determining the course and the width of "oil lines."

It is reasonable to suppose that the compressed folds do not extend to a great depth in a uniform curve, but that the rock masses have been readjusted by reciprocal movement. Wherever there has been so much geological disturbance as is the case in the Coast range, it is evident that structural conditions must be modified, not only by faults and fissures, but also by the thinning or thickening of the softer strata by reason of the compression to which they have been subjected. When the outcrop of the oil-yielding stratum can be found, it constitutes a most important guide to the prospector. A careful observation of it shows the horizontal direction in which the oil sand extends and the angle at which it is inclined. From the latter factor the depth at which the oil sand can be struck by drilling at any given distance from the outcrop can be calculated. But it frequently happens that the oil-yielding stratum does not crop out at the surface of the ground. In such cases, its dip and strike must be inferred from any of the rocks enclosing it which may be exposed, provided, always, that the oil sand and enclosing rocks are conformable. In California it frequently happens that, within a limited area, the exposed strata show a great diversity of dip, and the best guide as to the prevailing strike of the formation is the strike of the axis of the fold into which the strata have been thrown.

When the exposed rocks are situated near the axis of a fold, or when the fold of which they form a part is overturned, they are by no means an infallible guide as to the prevailing angle of the dip. In locating an oil well, the character of the fold affecting the rocks about to be prospected should be taken into account. There are conditions of the rocky strata, besides those of folding, which may determine the existence and the course of oil lines, and the most important of these are faults. The class of faults most likely to result in the formation of oil lines are those which have been caused by fractures extending in the direction of the strike of the formation, and which have allowed blocks of the earth's crust to slip past one another so that they are arranged in the form of steps. In areas of great compression, like that of the Coast range, it might be supposed that all the faults would be thrust faults, but in many instances the fracture which occasioned the fault is nearly vertical to the plane of the horizon—in which event it is frequently the case that the force of gravity controls the thrust.

HIGHLY PRODUCTIVE NEW FIELDS

The most remarkable features in the recent history of the petroleum industry in California have been the development of the Los Angeles oil field, the Summerland oil field in Santa Barbara, and the oil field of Coalinga in Fresno county. The Coalinga oil field is the most important yet developed in the border of the Central Valley of California. It is remarkable both for the amount and the quality of the oil which it has produced. Very productive oil fields have also been developed at the Kern River and at McKittrick in Kern County.

In the Los Angeles oil field fully 1,100 wells have been drilled within an area of about 2¼ miles in length and less than a quarter of mile in width. Moreover, a western extension of that oil field is rapidly being developed about a mile to the westward of what has heretofore been known as the Los Angeles oil field. The first portion of the oil field developed was at Second street park; and the discovery that oil existed there in valuable quantities was due to the enterprise of Messrs. Doheny and Connon, who commenced operation by sinking a prospect shaft 155 feet deep, at the corner of Patton and State streets. The way in which a forest of derricks grew up, as if by magic, and a district of quiet residences was transformed into a mining center, is matter of history.

The Los Angeles oil field, developed as it was in the midst of a city, is in itself a remarkable

incident in the history of oil mining. Furthermore, it gave an impetus to the petroleum industry in California, which within three years caused this industry to rise from a position of comparative insignificance to one of great importance.

As is well known, the petroleum found in the Eastern States is composed principally of hydrocarbons of the paraffin series. Investigations hitherto made on the petroleum found in California have shown that they are composed principally of hydrocarbons containing a greater percentage of carbon than do the corresponding members of the paraffin series. It is this excess of carbon that causes the difficulties experienced in manufacturing from the California petroleum illuminating oils which can successfully compete with illuminating oil manufactured from Eastern petroleum.

IMPORTANCE FOR FUEL PURPOSES.

Although only a small portion of the California petroleum is available for the manufacturing of illuminating oil, it can be resolved into other valuable commodities. It yields naphthas, gas distillate, lubricating oil and asphaltum. The greatest value of California petroleum is that it furnishes an excellent fuel. Repeated tests have shown that, for fuel purposes, from two and a half to four barrels of crude petroleum may be taken as the equivalent of one ton of good coal, the ratio of value differing according to the conditions under which the petroleum is burned.

The use of petroleum as fuel in this State certainly dates as far back as 1878. Although its superiority to solid fuel has been demonstrated for more than twenty years, it has only recently commenced to crowd out the black diamond from the railroad and the workshop. When it is considered that many millions of dollars are annually expended by California for imported coal, and that the substitution of petroleum for coal would result in the expending of these millions on a home product, the importance of the petroleum industry to this State can be appreciated.*

The Gold and the Silver Product of California.

The Banner Counties—Net Decrease in Production Not Discouraging—Quartz, Hydraulic and Placer Proportion of Product.

By Chas. G. Yale, Statistician of San Francisco Mint.

The Report of the Superintendent of the United States Mint at San Francisco shows that the aggregate gold product of California last year was $15,336,031, and of silver (stated in commercial value), $504,012. Nevada is still the banner gold-producing county ($2,171,510), as it has been for some years. In 1899, for the first time, Tuolumne county held second place ($1,635,769), relegating Amador to the third position ($1,544,868). Calaveras county is next with $1,265,564, and Placer fifth with $1,100,081.

Comparing the totals of gold and silver with corresponding figures obtained from the same sources in the year 1898, we find the gold yield of the State showing a decrease of $570,447, and the silver yield an increase of $89,957, making a net decrease from previous year of $480,490. This is a very good showing in view of the dry season last year, when so many quartz mines had to hang up part or all of their stamps for a time, and when the water season for gravel mining was very short indeed. Considering these conditions, in view of the fact that the State nearly held its own in bullion product, it is seen that the mining industry is really progressing instead of declining in product.

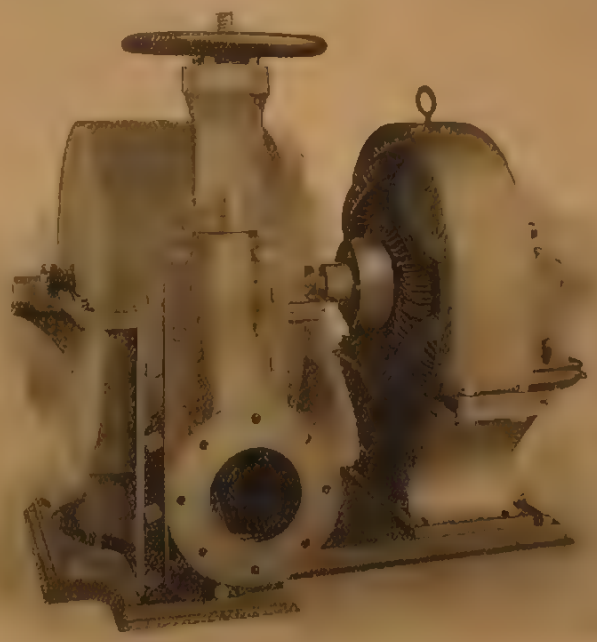
Of the $15,840,043 combined gold and silver produced, $12,290,138 came from quartz mines, $1,128,564 from hydraulic, $1,019,995 from drift and $1,401,386 from placer mines. Included in the placer output is that derived from dredgers, river-bed and bar, gulch, ravine and ordinary placer work by Chinese and whites. In the returns from quartz mines are included $353,743 gold and $210,219 silver, derived from copper mining and smelting operations in Calaveras, Shasta, and San Bernardino counties. Also included in quartz returns are $5,021 gold and $64,620 silver from silver-lead mines in the counties of Inyo, Mono, and San Bernardino. Thirty counties of the state produced gold, and twenty of these return some silver product. As nearly all the mines are gold properties, numbers of them make no return of silver, or report the product as only "nominal."

*Extract from address to members of the American Institute of Mining Engineers.

The Cascade Water Wheel.

Users of water power would do well to apply to James Leffel & Co. of Springfield, O., for a copy of the pamphlet on water wheels which they recently issued. Mining men know that there are occasionally instances where the Turbine type of wheel cannot be successfully used. In an experience of thirty-nine years of building and applying Turbines, the Leffel Co. found many such instances and set its engineers at work studying out a remedy for the difficulties which the Turbines had occasionally presented. The result of this study was the Cascade water wheel, which has been introduced in a number of power plants, including several belonging to mining companies.

The simplicity and lightness of the Cascade wheel are perhaps its distinguishing features. The accompanying illustration shows the complete wheel, giving only an incomplete idea of its construction, but serving to indicate the unusual simplicity of the machine. The wheel has no wearing parts except the journals of the shaft. The application of the water is at one, two or three points only and its action upon the wheel is thus greatly simplified while the frictional surface of the water is materially reduced. The occasional rubbing and constant wearing of the metal surface in Turbines are entirely obviated in the Cascade. The method of applying the water to open buckets which receive it by impulse and discharge it by reaction secures the highest possible efficiency in power.



THE CASCADE WATER WHEEL

The admission of the water to the wheel through one or more nozzles does not decrease the effectiveness of the water, but the nozzles increase the power in direct proportion to the increase of their number, requiring, of course, a proportional increase in the quantity of water. This is an advantage of great importance when the fact is considered that the amount of water supplied by any given stream varies considerably from time to time. Various sizes of nozzles can be conveniently substituted to suit the changing conditions of the water supply. Another advantage in the use of the Cascade over the Turbine is its slower motion under high heads. With but slight changes, the wheel can be so adapted in size as to obtain almost any required speed. An extensive experience in the application of water wheels to mining work has shown that the Cascade can be applied easily to different parts of the same plant. It is often convenient to use a wheel for the concentrator, another for the electric lighting plant, a third for the batteries and a fourth for the stamping and crushing machinery. When each of these different branches is run independently of the others any department can be stopped and started without interfering with the others. If one or more departments require intermittent power, a governor can be applied to the portion of the works in use, thus obviating the necessity of governors on the other wheels. When automatic regulation is necessary, and one wheel only is used a large heavy governor must be applied.

The wheel proper has two sets of buckets which are located on each side of a central, sharp, continuous, dividing ridge projecting a little in front of the entering edge of the buckets. The sharp edge of this ridge separates the jet of water before it reaches the buckets, keeping it divided into two equal portions so that each half of the jet is received on each side of the dividing ridge. The alternating arrangement of the buckets secures steadiness of motion. The buckets are so arranged as to secure the greatest strength and firmness. It is practically impossible for them to become loose, a common failing with those fastened to the wheel with bolts, nuts and similar appliances.

The wheel here shown has been in use for nearly two years at the plant of the City Water Works station in Columbus, O. The superintendent of the station says that he has to give the wheel no attention beyond filling the oil cup and turning on and off the power. The wheel is connected with a dynamo. In another pumping station the Columbus Water Works has a generator direct connected to a steam engine. The superintendent says that he has endless trouble and expense with this, and he believes there is no comparison whatever between the two powers, every item in the consideration being distinctly in favor of the Cascade wheel

THE DIAMOND KING: Cecil Rhodes, according to a character sketch in the Paris Temps, is generally very moody and taciturn, but becomes lively when his ideal is mentioned. That ideal is British imperialism. The Anglo-Saxon race, he argues, owns three continents already. It is the richest, most powerful, most happy. It is destined to rule the world, and any land not already in the hands of other strong nations belongs by right to the Anglo-Saxon. He made up his mind to conquer Africa for his race. For this he made his money, and with that money he hemmed in the Boers by annexing the territory around the Transvaal. For this he organized the Jameson raid, and prepared for the present war. Outwardly, he does not look like a milliardaire, for he dresses plainly, almost slovenly. He is a heavy giant, but a restless one. He is up early, riding around for a couple of hours. What the world calls society he hates, and women, at least white women, have no charms for him. His only personal luxury is his park at Groote Schuur, where he keeps lions and where he grows flowers. Polite speech is not his strong side, and he never answers letters. His boxes are full of unanswered letters; he attends to telegrams only.

Carnegie's Model Road.

The Cheapest Transportation by Rail in the United States—Carrying a Tonnage Equal to that of Three Great Pacific Roads Combined—Ore Handling Reduced to a Science.

J. T. Odell, the well-known railroad manager, describes in the New York Evening Post some extraordinarily successful transportation results attained on Mr. Carnegie's ore road from Lake Erie to Pittsburg. Mr. Odell is the general manager of the road. The most conspicuous example of success in lowering freight costs, he says, is the Pittsburg, Bessemer and Lake Erie Railroad, built from Conneaut on Lake Erie to Bessemer, near Pittsburg, a distance of 153 miles, for the exclusive purpose of supplying the Carnegie Steel Works with ore at the lowest possible cost. This road was undertaken, indeed, to demonstrate that certain commodities can be carried as cheaply by rail as by lake steamers.

The tonnage of the Carnegie Steel Co.'s raw materials and finished product (being 16,000,000 tons last year) is as great as the combined tonnage of the Northern Pacific, Union Pacific, and Missouri Pacific railways, embracing as they do more than 13,000 miles of track, and running probably 1,500 locomotives and 50,000 freight cars. This may seem a bold statement, but it is true. A few years ago the steel company became satisfied, after careful investigation, that, if a portion of their tonnage was separated from the general freight of the railroads, concentrated on a road controlled by their own company, and handled in solid trains, the cost of transportation could be materially reduced, and the reduced rate be remunerative to the railway. With this object in view, they secured a road of their own, running from their mills to their own docks at Conneaut on Lake Erie. The result of the operation of this railway shows as follows:

SOME GOALS FOR RAILROAD MEN.

The lowest rate per ton per mile, the highest average length of revenue haul in proportion to its track mileage, the greatest density of tonnage in proportion to its freight-train mileage, the greatest average paying load, and the lowest "ton-mile cost" of any road on the American continent reporting to the Interstate Commerce Commission. The average paying load of all its freight trains, including three branches, and with but little back-loading, was, for the year ending December 31, 1899, 777 tons. It is confidently expected when the south and north-bound tonnage is 70 per cent and 30 per cent, respectively, and the tonnage reaches 5,000,000 tons annually, as it promises, that the average paying load will be not less than 900 tons, or 4½ times greater than the present average paying load of the country. The maximum weight of the paying load for the year was 1,580 net tons, with the average as before stated of 777 tons. Of the ore trains, each earned on a 3½-mill rate per ton per mile (gross ton) $5.13 per train mile. The permanent maximum grade in the direction of the ore traffic will be thirty-one feet to the mile. There are five of these grades, aggregating a distance equal to about 30 per cent of the total distance. These grades are worked by an assistant engine. Each engine can lift nine trains per day over its respective territory, and by reason of assisting over these grades it added 2 9-10 cents per ton to the cost of handling the ore during the year 1899. The use of these assistant engines really makes a theoretical reduction of the grade to about an average of eighteen feet to the mile for the entire 153 miles. The road is laid with 100-pound rail, and the track ballasted with furnace slag. The bridges will carry 6,600 pounds to the lineal foot. The standard locomotive is the consolidation pattern, having cylinders 22x28 inches, and weighing 170,000 pounds on the drivers alone. The ore equipment consists mostly of steel cars, weighing seventeen tons, and carrying fifty tons of ore. The company is having built a few of what will prove to be the heaviest locomotives in the world, having cylinders 23x32 inches, and weighing 217,000 pounds on the drivers. With these locomotives, the total weight of an ore train, including the locomotive and light weight of the cars will be about 2,600 tons.

MIRACLES IN ORE HANDLING.

But it is not only in the operation of the road that greatest economy is obtained, but also in the transfer of the ore from the lake steamers to the trains. The Steel Company owns the entire harbor at Conneaut. Nine ships can be docked at the same time. Twenty-five thousand tons of all classes of freight can be handled every ten hours. The most modern machinery is used for handling ore and coal. A 6,000-ton ship can be cleared in fourteen hours, and in the same time, from the moment the hatches are opened, the ore can be at the furnaces at Pittsburg. A new steam shovel was completed last winter by which a train of thirty-five to forty cars will be loaded with ore in two hours. A 40-ton car of coal can be unloaded and partly trimmed in the ship in thirty-six seconds. Most of the switching at Conneaut is done by the haulage system (a cable running between the rails at about four miles per hour). The operating officers believe that with this railroad the utmost limit of all that is possible in solving the problem of cheap transportation has been reached. Their achievement shows what remains to be done, and can be done by the other railroads of this country in the same direction.

It is generally known that the owners of the Pittsburg, Bessemer and Lake Erie Railroad have not been content with cheapening railroad transportation of ore from the lake port to the works, but have had all along the larger object in view of reducing to themselves the cost of the ore for the whole distance from the mines in eastern Minnesota to Pittsburg, so as to enable them to defy competition with all other American steelmakers. To that larger end, they obtained control by lease of a number of deposits in the Missabe range, from which they take ores with steam shovels at the lowest possible cost. They have secured a uniform contract rate of 80 cents a ton for the entire output from the mines to Duluth on Lake Superior. From Duluth to Conneaut, they still have to depend largely on other vessels than their own. While the lake rate was only 60 cents a ton in 1899, it will be $1.25 during the coming season. But their own fleet will be enlarged by the end of this year from three to fifteen vessels, with sufficient capacity to carry the entire requirements of the works of four and one-half million tons at a cost of not over 50 cents a ton.

Nome News.

Stampeders and Grabbing Speculators—A Mild Winter—Coal $150 a Ton—The Biggest Ocean Race on Record.

A dispatch to the New York Herald, by Wm. D. Johns, from Nome, received May 5, and four months in transit, states that the whole region has been run over by stampeders, with dog teams, who themselves and by power of attorney have staked the whole country without knowing whether there is gold or not. They bring reports of good prospects where they have probably never done anything more than put a stake down in the snow, without disturbing a spoonful of dirt.

HARVEST FOR THE LAWYERS.

The beach and tundra near Nome are also being taken up in 160-acre tracts, regardless of the previous stakers. It is then surveyed by a surveyor, who gets an interest for the work. As there are no natural landmarks on the tundra, it will be almost impossible for the original locator to find his ground should his stakes be "accidentally" destroyed, and the schemers expect thus to acquire large tracts by what is no better than legalizing theft.

On New Year's eve there was a grand stampede to the creeks to relocate ground on which the assessment work had not been done. Men with dog teams, men on foot, with women scattered here and there, started out, those for the nearest creeks waiting and going out with lanterns, all ready to stake at twelve o'clock. Up the mountain sides near the town, in lonely gulches miles away up the creeks, on the rivers, lanterns could be seen flashing like fireflies or standing sturdy as a beacon light where some stampeder was at one post waiting for the first second of the new year to drive his stakes in the snow. Some claims had half a dozen men on them, while some of the most valuable had only one lucky "jumper" when midnight came.

TERRORS OF NORTH EXAGGERATED.

The weather so far has been fine, with only one storm. Travelling, contrary to all expectations, is much easier than in the upper Yukon country. This it is which has made the staking of so much ground possible. Men can take a dog team and go anywhere with comparative ease, the lack of wood being the only drawback. Should the country back from the coast prove good the expense of getting in supplies for winter will be small.

This winter has proved that the terrors of these northern regions have been exaggerated greatly, and that with fuel and provisions men can be made as comfortable, go about as freely and have as much health as in any of the northern tier of states. There has not been a case of scurvy this winter and no late cases of typhoid, the camp being remarkable healthy.

There is a plentiful supply of provisions, the companies having more than they let people know of, for the purpose, apparently, of giving them an excuse to raise the prices exorbitantly. Coal is still going up, selling as high as $150 a ton. Wood beach drift very poor—is $40, with an upward tendency also.

No mail has yet come in, but some is expected this month. Four carriers start out within a week of each other, one by way of Dawson and three by way of Kotmoe. One dollar a letter is charged. The government mail rate is $1 an ounce. Unless there is a terrible fire people will have a fine winter, and be prepared for the rush in the spring.

GOLD HUNTERS OFF FOR NOME.

The greatest race for gold ever made to any camp has just begun from Tacoma, Wash., and other outfitting points. A dozen steamers and numerous sailing vessels, all loaded to the limit with people, lumber, and mining machinery, have started for Behring Sea. By the end of May it is estimated that 20,000 people, twenty-five cargoes of coal, and 9,000,000 feet of lumber, will have been shipped to Nome.

The Mineral Wealth of Siberia.

Gold Along the Pacific Shore—Rich and Varied Deposits Throughout the Country—Encouragement to Settlers by Nominal Rates of Fare.

There is talk at Seattle and other Alaskan outfitting points of organizing expeditions to that part of Siberia bordering on the Sea of Okhotsk. Whether or not that is done, the stampede to Nome may easily become so disproportionate to the territory available that a part of the surplus population will cross Bering Sea to Eastern Siberia. As we have pointed out in an earlier issue, there is little doubt that a great gold-bearing belt runs along the Siberian coast, and the conditions seem to be such as to render development feasible.

Now that the Great Siberian Railway is within measurable distance of its goal (6415 versts, or 4,273 miles, having been virtually completed), attention may be called to the vast mineral wealth of Siberia generally. Although the gold deposits along the Pacific shore referred to seem to be uppermost in the public mind at present, other parts of the country are equally rich. Indeed, hardly any mineral can be named that is not obtainable somewhere in Siberia in abundant amounts. The mountains surrounding the Kirghisian plains are known to contain not only gold, but also copper, silver, and lead ore. The Altai Mountains, covering an area ten times as large as Switzerland, abound in copper ore, silver and lead ore gold and semi-precious stones. In the Kusnezki valley are beds of coal so vast as to suggest comparison with the Pennsylvania fields. The mountains of Eastern Siberia are rich in gold, silver and copper, and carry besides coal, iron ore and graphite. Immense mineral wealth is thought to exist in the banks of the mighty Lake Baikal, 30,000 square versts (0.66 mile) in area. Other districts equally worthy of particular mention might be cited.

Anxious to develop the natural riches of Siberia, the Russian government is doing everything that it can to encourage immigration thither. The Siberian Railway—which may almost be regarded, by the way, as an American institution, since most of its engines, many of its cars, and much of its other equipment came from here—is making rates of fare that have probably never been equalled for cheapness. Fourth-class tickets, good from any point in Russia to any one of 114 stations in Siberia, cost only two roubles or slightly more than one dollar. If the emigrant wish to go way through to Vladivostok by the railroad and its steamboat connection, now complete, a distance of about 5,000 miles, he must pay the exorbitant fare of $3.60! It must be cheaper to travel there than to stay at home and pay taxes.

The Bullion Product of Alaska in 1899.

Chas. G. Yale, the statistician of the United States Mint at San Francisco, finds from the returns that the District of Alaska has more than doubled its bullion product in the last year. The receipts of Alaskan gold at mints, assay offices, refineries, smelters, etc., for the calendar year

1899 were $5,602,912, and silver $229,343; a total of $5,831,355, or $3,199,844 more than in the year 1898. Of this increase it is estimated that $2,400,000 came from the new placer camp at Cape Nome last season, the first year in its history, and the rest of the increase from the quartz mines of Southeastern Alaska. The placer camps along the Yukon River give evidence of only slightly increased yield for the year. In Southeastern Alaska, including Douglas and Unga Islands, the quartz mines are now dropping 1,050 stamps and employing 1,308 men, at average wages for miners of $2.50 a day and board. The combined output of these quartz mines for 1899 was $2,704,176 out of a total of $5,831,355. This makes the yield of the placer mines of the District of Alaska $3,127,179, of which $2,400,000 came from beach and tundra claims at Cape Nome, and the balance or $727,179 from the placer camps along the Yukon River and its tributaries, placers near Golovin Bay, the beach sand mines at Lituya Bay, the hydraulic mines near Juneau, and the claims in Porcupine district, Southeastern Alaska.

The receipts at mints, assay offices, private refineries and smelters for the calendar year 1899 from the Northwest Territory (Klondike) were $15,986,627 gold and $267,390 silver; a total of $16,254,107. This shows a marked advance in output for the Klondike field, since the increase over the previous year is $5,028,198. The creeks of the Klondike district are now producing more gold than the mines of the State of California.

Theory vs. Practice in Geology.

Professor J. L. Gregory, of Melbourne University, Australia, has very decided opinions as to the difference between the theoretical study of science and the industrial application of scientific truths. He thinks that in America there is a more pronounced tendency to take practical advantage of the discoveries of science in business affairs than there is elsewhere. He says: "In my future duties in Melbourne, I intend to work up the mining side of geology and to take up the economic applications of the science. During the past thirty or forty years there has been a separation of the theoretical from the practical side of geology. That has been a great disadvantage to both, for there should be a close union between the two. A change is, however, taking place, particularly in America. In Montreal they are trying their best to bring the theoretical and the practical work into close touch."

Chinese Gold Discoveries.

Information relative to the gold discoveries in China was received at the State Department in Washington on May 7 from several United States foreign representatives. One report says: "In the gold sand of the sea mining, eight miles from Port Arthur, a gold nugget weighing one-fourth of a pound was found by three Chinese workmen, but they prudently divided the nugget into three pieces and disappeared in as many directions. There is no doubt that there is gold in the quantung, for the administration has taken the precaution to establish a strict guard, and has prohibited mining until further orders are received from the Ministry of Agriculture and government property."

MINING IN BRITISH COLUMBIA: According to a consular report, an English company will, during the present year, dredge the Saskatchewan River, British Columbia, for gold. It is stated that an English mining engineer, Mr. F. B. Hobson, has arrived in Montreal from London en route for Edmonton. When he first made representations to London as regards the feasibility of placer mining on the Saskatchewan, he was asked what the bad points were, and replied that in the opinion of some people the fineness of the gold found in the sands might preclude the saving of paying quantities, but they had discovered a process by which at least 75 per cent can be saved. The gold-holding gravel in the river bed averages a depth of 7 feet, although it has been known to go as deep as 25 feet. The plant used is called a New Zealand dredge, the cost of which is in the neighborhood of $25,000. It requires three hands and a master to man each one. These dredges work somewhat like those seen every summer in the St. Lawrence channel between Quebec and Montreal. Water is being used to separate the gold from the earth. It is stated that from tests made in hundreds of places in the river the gravel will produce an average of 25 cents per cubic yard, and that this earth, consisting of 2 tons, can be handled for 2 cents per cubic yard. The handling of 3,000 yards is estimated to be a day's work.

CANADA'S MINERAL OUTPUT: According to a report issued by the Canadian Geological Survey, the mineral output of Canada for the year 1899 is placed at $17,000,000. Of this sum, gold is the largest factor, the total being $21,049,000, of which the Yukon contributed $16,000,000. Coal is the next item of importance, the production for the year 1899 being $9,010,000. Since 1896, the mineral production of Canada has well-nigh doubled in value. The production of other minerals was: Iron, $248,372; lead, $977,250; nickel, $2,067,840; platinum, $835; silver, $1,831,371.

Of the chief contributors to the total mineral production of the country, lead and silver are the only two showing a considerable falling off, and that notwithstanding more favorable prices. This is ascribed to local causes in British Columbia not dependent on the value of the deposits.

TAMARACK'S ANNUAL MEETING: The annual meeting of the Tamarack Mining Co. was held in Boston on May 3. President Bigelow reported on the condition of the mine, satisfying the stockholders that the property is in a most satisfactory condition. The rock is running a little higher in fine copper than it did last year. The No. 5 shaft is now down to 4,200 feet and should reach the Calumet lode before December. It is expected to be a very rich shaft.

Latest Mining Decisions.

Specially prepared for THE MINING AND METALLURGICAL JOURNAL

Where two veins, having two apexes in different claims, unite in their dip within the perpendicular extension of the side lines of another claim, the owners of the last claim cannot contest as to the rights in the vein beyond the point of union, since they have no interest in either vein. Roxanna Gold Mining & Tunneling Co. vs. Cone et al., 100 Fed. Rep. (U. S.) 168.

A complaint which alleges that plaintiffs furnished defendant with a grub stake, to enable him to go to Alaska to locate and acquire mining claims, under an agreement that plaintiff should have one-half the mines so located, and that he did go, and acquired certain valuable mining claims, does not allege that defendant acquired the said mining claims by means of the grub stake so furnished by plaintiffs, as is necessary to entitle the latter to a share therein. Prince et al. vs. Lamb et al., 60 Pac. Rep. (Cal.) 689.

In an action by one who has furnished another money as a grub stake to go to Alaska to locate mining claims, for specific performance of an agreement that the party furnishing the funds should be entitled to one-half the claims located, where the expense of the trip is not shown, the court will take judicial notice that $50 is not an adequate consideration to entitle plaintiffs to specific performance of a contract giving him one-half the fruits of so toilsome and expensive a journey and the expense of locating claims. Prince et al. vs. Lamb et al., 60 Pac. Rep. (Cal.) 689.

Civ. Code, § 3391, provides that a specific performance cannot be enforced against a party to a contract if he has not received an adequate consideration for the contract, or it is not as to him just and reasonable. A complaint alleged that plaintiffs furnished defendant with $50 as a grub stake, and that he agreed to go to Alaska and locate mining claims under an agreement that plaintiffs should have one-half of all claims so located, and that defendant did locate certain claims of great value, and prayed that he be decreed to convey an undivided one-half interest therein to plaintiffs. Held, that the complaint, in the absence of any allegations as to what the claims had cost defendant, was demurrable on the ground that the consideration was inadequate. Prince et al. vs. Lamb et al., 60 Pac. Rep. 689.

A complaint alleged that plaintiffs furnished defendant means to go to Alaska to prospect for mining claims, and that defendant agreed that plaintiffs should have an undivided one-half of any discovered, together with one-half of net proceeds of minerals mined by defendant from such claims after one year from the date of the agreement. The complaint further alleged that defendant discovered certain mining claims, and had sold some of them; that said claims were worth a sum stated, and that defendant had mined therefrom minerals worth a certain sum, that defendant refused to convey any part of said claims to plaintiffs, or to account to them. The complaint prayed for an accounting as to minerals mined and money received, and that defendant be required to convey to plaintiffs an undivided one-half interest in any claims owned by him, and be restrained from conveying any of said mining claims pending the action. Held an equitable action. Prince et al. vs. Lamb et al., 60 Pac. Rep. (Cal.) 689.

Civ. Code, § 2511, provides that a mining partnership exists between two or more persons who own or acquire a mining claim for the purpose of working it, and actually engage in working the same. Civ. Code, § 2395, defines a partnership to be the association of two or more persons to carry on business together and divide the profits. Plaintiffs furnished defendant means with which to go to Alaska to locate mining claims. Defendant agreed that plaintiffs should have an undivided one-half of all mining claims located, together with one-half net proceeds of all minerals mined therefrom after the first year. It was also agreed that, in case defendant discovered any valuable claims, he should notify plaintiffs, and they should thereupon go to the place where defendant had located said claims, and assist in working them, they to furnish one-half the labor and expense thereof; and said plaintiffs to be owners of an undivided one-half of any claims so located, and to have one-half the minerals mined therefrom. Held that, though the contract may have contemplated the formation in the future of a mining partnership, it did not constitute a copartnership which commenced on defendant's starting for Alaska, so as to entitle plaintiffs to an accounting, where defendant refused to let plaintiffs work claims discovered by him. Prince et al. vs. Lamb et al., 60 Pac. Rep. (Cal.) 689.

Link-Belt Electric Patents Sold.

The Link-Belt Machinery Co. of Chicago sent to its patrons on May 1 the following letter announcing the sale of its electrical mining machinery department to the Goodman Mfg. Co.:

The enormous increase in our regular lines of manufacture in which we have been engaged for the past twenty years, and the greatly increased demand for our electric mining and haulage machinery, together exceeding the entire capacity of our plant, has made it advisable for us to retire from the manufacture of electrical machinery, and we beg to announce that we have to-day sold to the Goodman Mfg. Co. the patents, patterns, stock and good-will of that part of our business known as the Electrical Mining Machinery Department.

All the unfilled contracts and orders for supplies now held by us have been transferred to the Goodman Mfg. Co., who, with ample capital, facilities and ability will complete all such contracts and orders.

The new Company, with Mr. H. E. Goodman as general manager, and Mr. Chas. E. Davis as superintendent, will continue the manufacture of the electrical mining machinery and specialties so long made by us, and we bespeak for them the continuance of the liberal patronage of the users of this class of machinery so long enjoyed by us.

The Link-Belt Machinery Co.,
E. A. Farrar, President.

The Goodman Mfg. Co., which thus assumes the large volume of business of the Link-Belt Co., has its office and works at 39th St. and Stewart Ave., Chicago. The officers are Frank S. Washburn, president; Elmer A. Sperry, vice-president, Herbert E. Goodman, general manager; Charles H. Strawbridge, secretary, and Charles E. Davis, superintendent. In announcing its purchase of the Link-Belt Co.'s patents and stock of electric mining machinery, the Goodman Co. says: "The entire force of the department has been taken over, the engineering staff materially increased, and the shop facilities improved, so that we are unusually well prepared to complete all contracts for mining machinery and supplies not fully executed by the Link-Belt Machinery Co., and to execute without delay additional orders for electric mining machines, locomotives, dynamos, motors, and mining supplies."

Electric Machinery for Nome.

A. L. Kasson and A. W. Williams of the Northwestern Fixture Co. of Seattle, Wash., have been in Pittsburg negotiating with the Westinghouse Electric & Mfg. Co. for a large quantity of mining apparatus to be used at Cape Nome. The order will include a large number of dynamos and motors, 250,000 pounds of insulated wire, 125 tons of copper wire and other machinery.

TRADE NEWS.

A Leyner Rock Drill has been sold by the Edward P. Allis Co. of Milwaukee to the proprietors of the Mansfield mine at Crystal Falls, Mich.

The Montana Ore Purchasing Co. has moved its New York office from 100 Broadway to the building of the National Bank of Commerce, No. 31 Nassau St.

The Compania Minera de Penoia of Mapami, Mexico, has placed an order with the Edward P. Allis Co. of Milwaukee for three large engines and generators, one hoisting engine, an elevating and conveying plant, an electric locomtive and appliances.

The Lidgerwood Mfg. Co. of New York has taken a $12,000 contract for three auxiliary engines for the Queensland government at Armstrong, Whitworth & Co.'s Walker Shipyards, Newcastle-on-Tyne. The Lidgerwood Co. is also making an electric hoist for mining use in Japan.

The Lufkin Rule Co. of Saginaw, Mich., manufacture so many kinds of measuring tape that an engineer or surveyor would have to be fastidious indeed not to find in the collection exactly what he wanted. In one respect, however, all these varied styles are alike—namely, in their rigid accuracy and reliability under all conditions.

For many purposes woven tapes are sufficiently durable, and the Lufkin Co. manufactures a superior line of these. Mining engineers, however, are commonly content with nothing less than extreme and absolute accuracy of measurement, and where this is the case only the best of steel tapes will serve the purpose. Some of the Lufkin steel tapes are finely adapted to engineering field work; one of them, for example, though fifty feet long, weighs only five ounces complete, and can be conveniently carried in the vest pocket.

It is an interesting fact that, whereas at one time all the steel and metallic tapes used in this country were made in England, the Lufkin Rule Co. now ship their product regularly to the British Isles.

One of the handsomest, most copiously and aptly illustrated, and generally satisfactory trade publications that we have seen in a long time is "Catalogue No. 40," issued by the Murray Iron Works Co., Burlington, Iowa. Organized in 1870, this enterprise has been growing year by year ever since, until to-day the plant comprises a foundry, two machine shops, and a boiler shop, said to be in each case the largest works of their kind in the state. Boilers and engines, complete steam-power plants, pumps and heaters, stationary, portable, and mining engines, ice and refrigerating machines—are the general lines manufactured. Some of their products have been designed with special reference to the needs of mining installations, and mine managers will find their problems anticipated and solved in the Murray machines.

Hydraulic power, compressed air, electricity, and other modern applications have been freely adopted by the Murray Iron Works, and keep down the cost of production. The four great departments of the plant supplement each other, and are worked harmoniously and economically together so that the combined product is brought to market at minimum cost.

Purchasers can always be depended upon to inform the seller of any feature of his goods that displeases them, but they are not always ready to let him know when they are pleased. The numerous letters of commendation received by the Duval Metallic Packing Co. from its customers furnishes a conspicuous exception to this general rule. This company publishes a little pamphlet containing more than eighty letters from users of Duval packing, all of them telling of the good service rendered by the packing. Several well-known mining companies are using the packing at the present time, among them the Calumet and Hecla, the Boston and Montana, the Quincy and the Smuggler. Instances are reported where the packing has given seven years of continuous service without renewal or attention. The office of the makers is at No. 126 Liberty St., New York City.

The International Correspondence Schools of Scranton, Pa., announce two courses of instruction intended especially for students of mining and metallurgy. One is the metal mining course, which furnishes instruction in modern methods of metal mining, prospecting, and managing ore mines. The other is the metal prospectors' course which qualifies the student to make assays of ores and to prospect for gold, silver and other ores. These departments are conducted by Henry M. Lane, a successful teacher and practical engineer, and Frank H. Lerchen, an experienced assayer and metallurgist.

The Gates Iron Works of Chicago is enjoying rather more than its share of the good times. For two years (except during the recent brief strike) its plant has been running night and day, and for some time ahead at least, equal activity is assured. The export trade has for a long time been a marked feature of their trade business, and at present this department is progressing more rapidly than ever.

Although the Gates Iron Works is commonly thought of in connection with mining machinery, some of its products are widely used in other lines. The Gates Rock and Ore Breaker, for example, sold more freely in 1900 than ever before—a fact due in part to the extensive use of the breakers by railroads for ballasting work.

The Company has just issued its general catalogue which is a synopsis of all its special catalogues. It is a well-bound volume of 238 pages, and the information it contains is presented in a most interesting manner, made especially attractive by the illustrations. Among the special pieces of machinery described are the famous Gates rock crusher and ore breaker, the Gates revolving screens, elevators and mining cars, the Dodge and Blake crushers, the Gates crushing rolls and the Bradley Chilian mills. In other sections are taken up the ore feeders, the stamp batteries, including the Tremain steam stamp mill, the Hartz one-compartment all iron jigs, the Gates vanner, the Halett stratifying table, the trammels and revolving sand pumps. Other features of the catalogue are the descriptions of cyanide plants and many articles of machinery of interest to persons concerned with the metallurgical side of the industry.

Construction and Development News.

J. F. Boyd of Shelbyville, Tenn., is in the market for a water wheel.

W. A. Liller of Keiser, Va., will soon purchase an 8-HP. gasoline engine.

F. H. Heald of Randsburg, Cal., wants a steam hoist, cars and track for a coal mine.

The estate of A. S. Van Mickle, Hazleton, Pa., is about to remodel its coal breaker.

The Hawkeye Mining Co., Oolagah, I. T., wants a 40-HP. boiler and an 80-HP. engine.

The Fingerville Mfg. Co. of Fingerville, S. C., is in the market for engines and boilers.

W. H. Aston of Bridgeport, Texas, is in the market for a complete outfit for coal mining.

The Jamison Coal Co. of Greenburg, Pa., is about to install a 600-HP. plant for its coke ovens.

W. D. McNeill, of Warrenville, S. C., will soon buy a 1,000-HP. cross compound condensing engine.

Ernest Favot of Searles P. O., Cal., owner of a mine at Slate Range, will soon put in a two-stamp mill.

E. Folk & Co. of Suffolk, Va., will purchase two gasoline tanks with a capacity of from 100 to 200 gallons.

M. B. Johnson of Chloride, Ariz., is raising capital to develop the Gladstone group of mines near Chloride.

Brown and Glover of the Mayflower mine, Randsburg, Cal., are likely to put in a mill and cyanide plant.

The Carbon Coal & Coke Co. of Mammoth, W. Va., is about to purchase an electric generator for mining work.

The Tennessee Coal, Iron, and Railroad Co. will soon purchase coke oven dinkeys for its Birmingham plant.

John A. Brewer of Pembrooke, Va., is said to have discovered copper deposits on his property and is likely to develop.

J. S. Laverty of Talladega, Ala., has discovered a large deposit of iron ore on his property and will undertake development.

George Taylor of Manchester Center, Vt., is interested in the purchase of crushing and pulverizing machinery for talc mines.

The Springfield Commercial Co. of Springfield, Tenn., is in the market for conveying apparatus for loading and unloading cars.

Forty-nine acres of coal lands have been purchased by the Consolidation Coal Co. of Cumberland, Md., and will be developed.

B. R. Hutchcraft of Barbourville, Ky., is one of the incorporators of the Knox Gem Coal Co., which will develop 400 acres of coal land.

The Laurel Creek Coal Co. of Quinnimont, W. Va., will soon purchase an eight-foot mining fan and power machinery for operating it.

John G. Duncan of Knoxville, Tenn., desires prices on a second-hand vertical mining pump with capacity of from 5,000 to 10,000 gallons daily.

A new hoist will be erected on the Gold Hill mine at Smith Flat, El Dorado county, Cal. The engine and boilers are now on their way to the mine.

B. L. Berkey, manager of the El Paso Mine, Mill & Smelter Supply House of El Paso, Texas, is in the market for a set of rollers for sheet metal.

Elizabethtown, N. M., has been chosen as the business headquarters of the Golden Ajax Mining Co., recently incorporated under the laws of Colorado.

The old Tiewankee group of mines at Bingham, Utah, will be developed by Col. Shaughnessy, its new owner. New pumping and hoisting apparatus will be needed.

There is a talk of doubling the capacity of the thirty-stamp mill at the Yellow Aster mines in Randsburg, Cal. Burcham, Mooers and Singleton are the owners.

The Colorado-Georgia Smelting and Gold Mining Co., of which James M. Smith of Atlanta, Ga., is president, has organized to erect a $60,000 gold smelter at Gainesville, Ga.

The Union Coal & Coke Co. is about to increase the working capacity of its mines, at Watts, Ala. The number of its coke ovens will also be increased from thirty-five to sixty-five.

A. H. Hiatt and B. F. Haynes of Sonora, Tuolumne county, Cal., intend to erect a concentrating plant on their Victoria mine. A two-stamp mill has just been placed in operation.

G. B. Markle & Co. of Jeddo, Pa., expect to build at their colliery one of the largest breakers in the anthracite region. The old workings of their colliery, which have been flooded for many years, will be reopened and retimbered and new workings will be opened in the western end of the basin. Markle & Co. have begun at Jeddo the erection of a large machine shop.

Thompson and Boyle of Los Angeles, Cal., intend putting up a plant for the reduction and testing of ores and samples. The plant will be composed of a Lane slow-speed roller mill and cyanide plant of their own manufacture and concentrating machinery. Nothing has been done towards securing estimates on the concentrating machinery.

PERSONAL.

President Agassiz of the Calumet and Hecla has been in Houghton, Mich., inspecting that famous mine.

A. F. Cordon, for three years chemist of the Mansfield mine at Crystal Falls, Mich., has accepted a position with the Oliver Mining Co. at Virginia, Minn.

Joseph F. Spellman, a representative of the Chrome Steel Works of Brooklyn, N. Y., has been travelling through Southern California in the interests of his company.

G. W. Mainer of New York is now on the west coast of Vancouver Island, B. C., organizing development work on the John Bull group of mineral claims on the Alberni canal.

General Thomas Dennis, for thirty years mining captain at the Franklin mine in Houghton, Mich., has been appointed superintendent of the Rhode Island mine vice Captain Samuel B. Harris.

Wm. I. Medill has relinquished his position as manager of the State Ore Sampling Works at Idaho Springs, Colo., to become assayer and chemist for the Southern Smelting Co. of Oakdale, Ga.

AMONG THE ENGINEERS.

Lew E. Aubury, the Los Angeles mining engineer, while in Mariposa, secured bonds on several mining properties, and purposes working them at an early date.

Leon M. Hall, consulting engineer on the electrical machinery construction for the Comstock

Pumping Association, has returned to San Francisco from an Eastern trip.

T. H. Ellis of Seattle, Wash., has completed a tour of the Salmon Basin district in King county in the interests of a company about to undertake extensive mining development in that section.

J. S. Holden, an English mining engineer, has been in Kamloops, B. C., looking at several mining properties as the representative of the London and British Columbia Gold Fields Syndicate.

J. Fleetwood Wells is superintendent of the mining properties at Ten-Mile Creek, Nicola, thirty miles west of Kamloops, B. C., which have been bought by an English syndicate headed by J. W. Broomhead.

CORRESPONDENCE

MICHIGAN.

(From Our Special Correspondent.)

Houghton, Mich., May 7, 1900.

On May 4 the Arcadian mine began unwatering the old shaft on the Amgdaloid lode. The shaft is on the property bought a year ago or so of the St. Mary's Canal Co., and is about 200 feet deep.

The Postal Telegraph Co. will be doing business in the copper district very soon. It has secured access to Houghton over the Long Distance line of the Erie Telephone Co. and will open offices in all the prominent towns of the copper district. Hitherto, the Western Union has enjoyed a monopoly of this business here.

On May 1 a strike was threatened on the Osceola Consolidated, where 1,000 men are employed. The miners demanded an increase of $60 a month for men working on company account, and a five-hour day on Saturday with ten hours' pay for men who had worked the preceding five days. The demand was temporarily granted, pending the referring of the matter to the Boston office for final settlement.

A sample cargo of fifty tons of mohawkite from the Mohawk mine will soon be smelted by the Orford Co., or some other Eastern concern. The smelter doing the work must arrange to sublime the arsenic, amounting in weight to fifteen tons in fifty of mohawkite. This large amount of the deadly poison makes the handling of the ore a dangerous matter. The constantly varying width of the Mohawk fissue is always a source of comment and conjecture. The vein has reached twenty-eight inches, and has also narrowed down to five inches. The seam has been traced to the surface from the point where first encountered for a distance of 168 feet and about 200 feet on the dip of the lode. Recent developments are encouraging, giving rise to the hope that the vein will hold in width and length. The vein will be opened thoroughly.

In the Baltic mine, twenty miles south of the Mohawk there has been encountered a double arsenide of copper and nickel closely resembling mohawkite. The ore is a mere seam, but may develop into something more extensive. It is naturally of great interest among mining men and scientists, but its chief value at present is in corroborating the opinion that the occurrence of the fissue vein in the Mohawk is something more than a mere freak of nature.

The coal famine which threatened to hamper seriously the copper mining interests hereabout has at last been broken with the opening of lake navigation and the arrival of numerous cargos of soft coal.

MISSOURI.

(From Our Special Correspondent.)

Joplin, Mo., May 7, 1900.

Sales for the week ending May 5 were 836 tons less of zinc and nine tons more of lead, as compared with the record for the preceding week, while a comparison with the corresponding week of 1899 shows a dropping in the zinc item of 330 tons and an increase in lead of 243 tons. This spring the increased product seems to be in lead rather than zinc ore. All previous records went down before the lead achievement of last week, so far as the Joplin producers are concerned. The price of lead is stationary at $54 a ton and zinc is $31 a ton, making lead a much more profitable article. Lead ore is $2 higher than a year ago, while zinc is $19 a ton less, another item in favor of lead.

The actions of the zinc ore buyers seem to demonstrate that they are looking for quantities of zinc. The producers are watching them, and several of those who get out high grade ore have declined to sell in the past week, feeling confident that sooner or later a higher price is coming, probably before the end of this month.

A noteworthy feature in the Joplin list of producers is the reappearance of the Leonard land with a record of 152,260 pounds of zinc and 1,930 pounds of lead. This property was for some time under contract to the United Zinc Companies, but it now appears again under the old name.

The total production figures for the week for the district are: Zinc 9,664,680 pounds, lead 1,414,840 pounds. The various centers contributed to this total as follows:

	Zinc. lbs.	Lead. lbs.
Joplin	2,149,930	658,230
Galena	1,834,330	331,760
Carterville	1,249,850	235,360
Zincite	440,790	2,550
Webb City	696,140	61,150
Oronogo	904,280	2,050
Aurora	1,170,000	24,700
Cave Springs	70,740	1,990
Carl Junction	125,410	.....
Granby	330,000	18,000
Roaring Springs	53,820	15,150
Duenweg	297,850	63,700
Neck City	34,120	.....
Stotts City	85,820	.....
Everton	63,700	.....
Ash Grove	52,700	.....

The Webster-Mott Mining Co. which was incorporated on May 5 will operate a forty-acre lease on the land of the Isabella Mining Co. near Duenweg. This company is noteworthy from the personnel of its incorporators, many of whom are public men who are known all over the country. The officers are: A. C. Pettijohn, President; Chas. Schweickhardt, Vice-President; F. W. Mott, Secretary and Treasurer; F. R. Mott, Manager; James Roach, Superintendent.

(From Our Special Correspondent.)

Bonneterre, Mo., May 7, 1900.

Let me urge you to get some one of your staff, not a novice in reporting as I am, to come here in your interest. You, through such a reporter, will gather a harvest of news.

It is strange how innocent, in their knowledge of the value of this lead territory, investors of mining capital in the money centers of the country seem to be, and particularly is this true of the Atlantic seaboard people. Send your reporter to write the past and present history of this territory—it is no new thing; describe its topography and geography, its geology and mineralogy, its forestry, farm and mine products. No mining territory has ever, or will ever, equal this in extent, products, and profits. Your reporter, being true to facts, will verify the assertion. We know it is so, and that it has been so. That it will be so, for years, is demonstrated in actual work, by the surveys and the estimates of the mine experts and mine engineers.

The news you have given has, evidently, been effective to some extent, for there are now some people here from New York, and from other Eastern cities, investigating the territory and existing mining properties. Your reporter could save investors such expenses, for he could collect and supply the data, true and reliable, upon which they could, with confidence, invest their money with an absolute certainty of its return with large profits. In illustration of this statement, the official report of one of the mine properties of this place is given: Capital invested, $2,500,000; employes 583; yield for the year ending June 30, 1899, 34,450,200 pounds of pig-lead; cost of production, average, 2 cents a pound; market price, average, 4¼ cents a pound. In five years the capital and expenses are returned with $1,375,647.50 gain. This company is no exception. The other producing properties do as well. Send your reporter, for he can do a world of good for you, your readers, the bona fide investors of mining capital, for our people, and for the owners of the thousands of acres of lead-ore lands, just as good as those that are exploited, that are awaiting buyers.

W. N. N.

NEW MEXICO.

Jicarilla Mining District.

(From Our Special Correspondent.)

White Oaks, N. M., May 2, 1900.

The American Placer Co. which, it is supposed, recently bought the holdings of the Jicarilla Placer Co. is preparing for active operations in the placers of the Jicarilla mining district in the Jicarilla Mountains, ten miles northeast of White Oaks. It is supposed that this company will control some 5,000 acres of placer ground, which will be worked with machines, the water being obtained from wells drilled for the purpose.

They have within the past week placed on the ground a No. 5 Star Drilling Machine, and it is expected that the boiler, drills, etc., will be brought out this week and in the course of twelve or fifteen days will be ready for business.

The writer is informed by one of the interested parties that the intention is to sink six or eight wells to a depth of 1,000 or 2,000 feet, and if these fail to supply sufficient water for the purpose water will be piped from springs in the Capitan Mountains, a distance of eighteen miles.

The men most active in organizing the the Jicarilla Placer Co. were Dr. M. G. Paden and G. W. Pritchard, both of White Oaks. The 320 acres located in 1898 have since increased to 5,000. The deal with the American Placer Co. was consummated in the latter part of January, 1900.

There is, however, likely to be some difficulty in delivering title to the purchasing company, for the reason that much of the ground located by the Jicarilla Company had been previously located and was being worked at the time the Jicarilla Company located, and is still being worked. It is, however, announced that the purchasing company intend buying off all persons having prior rights and thus avoid difficulties liable to arise by pursuing the opposite course, a plan that has much to commend it.

There are now four gold mines and one coal mine in operation in the White Oaks camp—the Old Abe, South Homestake, Lady Godiva, and Boston Boy. Of these the Old Abe is the most important and the most developed. The shaft is now down 1,200 feet and work on that level is being rapidly pushed. The streak of ore worked is about sixteen inches wide, exclusive of ore chambers which are occasionally found, and averages about $8 a ton in value. The equipment consists of a twenty-stamp mill, a large new hoist erected last summer run by two 60-HP. engines, a 60-HP. air compressor, and a cyanide plant of sixty tons daily capacity, also erected in the summer of 1899. In connection with this property is the Old Abe coal mine, which at present is the only coal mine operating in this vicinity. There are others here, but in consequence of the refusal of the E. P. & N. E. R. R. to haul White Oaks coal, operations on these other properties are suspended.

WASHINGTON.

(From Our Special Correspondent.)

Seattle, Wash., May 5, 1900.

Seattle is now the half-way house for the hundreds of mining men who expect to make their fortune out of the Cape Nome sands this summer. Men and machinery are arriving here daily on their way to the north. It is estimated that mining machinery worth not less than $5,000,000 is now on its way to Nome. One company has shipped six miles of railroad track and the entire equipment for a line from Nome to the company's mines which are five miles back from the beach. The investment of this company alone will not be less than $250,000. Its holdings comprise several groups of the richest claims yet found.

Private individuals and companies are not the only ones who are spending money on the Nome excitement. It is costing the Government a goodly sum to purchase transports and establish military posts and make the necessary surveys of harbors and rivers. Washington seems to be fully aware of what is going on up there, and is making every effort, it would seem, to safeguard the interests of the miners and to place at their disposal all the information it can secure for their guidance. Some of the big transports used by the War Department to carry troops back and forth between San Francisco and Manila have been released and are now doing duty in the Cape Nome service. These ships have a large freight capacity and are capable of accommodating from 600 to 1,000 passengers each. Besides these boats, there are dozens of steamers engaged in the Nome traffic, many of which have sold all their first-class accommodations at a high rate. The volume of the business has served as an incentive to undercautious and overzealous shipping men to make use of unseaworthy craft, as was the case in the Klondike rush, and the authorities have been obliged to exercise unusual vigilance in their inspections. The Cape Nome rush is having its effect upon the citizens of Washington. At first the residents of the state looked on the movements with interest and amazement, but the Nome fever now seems to be infectious, and numerous cases are reported among the citizens of Seattle and the surrounding cities and towns, until it is estimated that between 3,000 and 5,000 are about to leave Washington State for Nome. This may lighten the work for the census enumerators, but it makes work for everybody else.

GENERAL NEWS

ARIZONA.

The erection of a 250-ton furnace has begun at the United Globe Smelter at Globe. The company hopes to begin work with the new smelter without delay.

The excitement caused by the discovery of rich gold-bearing quartz near Jerome has abated to some extent. A heavy snow fall between Jerome and the point of discovery kept many prospectors away and drove most of them on the spot back to Jerome. Good weather will make a change, and there will be considerable activity here before the season is far advanced.

Bent and Sampson say that in the Centennial in the Arizona district they have the largest vein of wolfram ore in Arizona.

It has been found that the big cement tanks in the Chemehuevis Valley at the old placer will run $460 to the ton. The cement is soft and easily crushed. The owners think of erecting a plant to work it without the use of water.

CALIFORNIA.

The big copper mines at Campo Seco, in Calaveras county, are showing up splendidly at present. A solid wall of metal has been struck. About $5,000 a month in gold and silver is also being taken out, meeting the total operating expenses, and the copper is clear profit.

The Church mine in El Dorado county has been bonded and will resume operations.

The Providence mill in Tuolumne county has suspended operations for the time being, but development continues.

Tuolumne county has another producing mine coming into prominence in the Victoria, near Sonora. Rich rock going $25 to the ton in free gold is being taken out of this property. The shaft is down fifty feet, showing an eight-foot vein. A two-stamp mill has just been put up, which will be running in a few days. The stamps weigh 1,000 pounds each.

Crane & Co. of San Francisco have secured the contract for the pumping plant and pipe line from the wells at Goler to the Yellow Aster mill at Randsburg, in Kern county. The plant is to cost $55,000. The completion of the wells and the necessary buildings will bring the cost up to something like $75,000. Work now contracted for and other contemplated work will involve an expenditure of not less than $125,000. The development at the mines with the ore blocked out, fully warrants this and more if there is plenty of water can be secured. The old well, which they thoroughly tested, says the Randsburg Miner, showed that there was a large supply. The location is in the valley and with the well 400 feet deep there is probably an inexhaustible supply to draw from. The new reservoir at the mill is nearly completed. It is 100 feet long and twenty feet wide, and is built of solid masonry on a foundation blasted out in the hillside. It will be cemented, both bottom and sides, in the most thorough manner. Its capacity is 100,000 gallons.

The water question in Randsburg is not as serious as at one time. The copious rains which fell all over the state last month lifted a burden from the shoulders of the miners and particularly those of the desert regions.

A clean-up at the Pinmore mine at Randsburg in the fore part of April resulted very satisfactorily to the owners. The ore was from their own mines. The mill is now kept running nearly all the time on their own and custom ore.

The Red Dog, another Randsburg custom mill, is receiving most of the business it seems. With plenty of water, the mill is treating fifty-ton lots from the Butte Lode Mining Co.'s high-grade ore, and 15-ton lots from the Val Verde, Willard and Hammond mines, besides other smaller lots from other properties.

The eight-hour-day rule has been adopted by the Mariposa Mining and Commercial Co. in its mine at Mariposa. Two machine drills were put in operation on the Mariposa mine, owned by the company.

The Krogh Company is running its quartz custom mill at Mariposa continuously at present.

A. Hemme of San Francisco is working a force of men on the Gold Bug mine, near Bull Creek, Mariposa county. He has been taking out some fine ore from the mine and prospects are encouraging.

In order to settle company differences the Bunker Hill group of mines—the Bonanza Queen, Monster, Emmett and Bunker Hill—four mill sites, a boarding house and a quantity of tools have been offered for sale. The mines are the east vein of the Mother Lode, on the Pine Tree vein, two miles north of the Mariposa grant and Benton mills, and adjoin the Red Bank and Crown lead mines. Development work which has been done on the property gives every indication of good values. Thomas M. Carroll of San Francisco is president of the Company.

Some fine quartz gold ore has been encountered in the Esperanza mine in the Cedar mining district, Los Angeles county. The owners, Messrs. Gough and Shaefer, have about twenty tons of first-class ore on the dump.

Operations on the Red Rover mine at Acton, Los Angeles county, are expected to commence in the near future. Everything is in readiness, and W. R. Shilling is still in charge.

A fine ledge of gold quartz was recently uncovered in a mine owned by E. Remus at Acton, Los Angeles county.

Frank Grimes of Ventura expects to put up a steam arrastra on his mines in the Tejunga, Los Angeles county.

COLORADO.

Idaho Springs is talking about the new strike in the Newhouse Tunnel and calling it one of the richest discoveries ever made in the district. The vein is about fifty feet wide with about thirty feet of pay ore. The Newhouse Tunnel management has undertaken to drift for 200 feet on the vein on each side of the shaft. The ore is lead and copper, with some silver and gold values, and averages about $15 a ton. Some streaks of smelting ore are found which run as high as $75. This is the deepest strike in the entire district. The vein had been traced on the surface for several miles. It has been shown to have a depth of over 2,000 feet.

Southeast of Salida is the new camp of Turrett, where a strike is reported at a depth of 300 feet in the Gold Bug. Gold, silver, and copper running from $40 to $106 a ton are shown in the assays of the pay-streak. The vein is perpendicular, resembling the Mary Murphy of St. Elmo.

Ninety feet down in a shaft in the Greenhorn district, southwest of Canon City, a cave has been discovered. The roof and walls of the cavern are studded with copper flumes, and material resembling slag and leached quartz. On the floor are boulders strong in copper and copper glance.

Cripple Creek's output for April was $1,466,000, a decrease of $750,000 as compared with March. This loss is accounted for by the closing of the Isabella and several other big mines. The average monthly output for the first four months of 1900 is $2,648,247, or about 4 per cent advance over 1899. This record for the non-productive season foretells a total of $30,000,000 for this year against $20,000,000 last year. The dividends for the four months exceed $2,000,000.

MINNESOTA.

Three new iron companies were formed at Duluth last week, two by the Rockefeller and one by the Federal Steel interests. They are to handle mines bought by these companies. These two concerns have spent not less than $3,000,000 in land purchases in the past year. The mines of the Vermillion range, all belonging to the Federal Steel and Carnegie Companies, are shipping their daily output of about 6,000 tons. At the five mines on this range there are now nearly 800,000 tons of stock on the surface, the result of winter mining. The Chapin mine at Iron Mountain, Mich., will ship more than 1,000,000 tons this year, and the total from the Iron River region will be much larger than ever before. The American Mining Co. is opening two new mines on the Marquette and will take a good deal of low grade ores from them. All ore from this company is for the steel and wire combination. The mines of this company are so far more active than ever before and show no signs of a reduction of force or a curtailment of output.

Because of the success of a plan to fix a low lake freight rate on iron ore, engineered by the Rockefeller interests last winter, rates are likely to drop so far that the season charters of those in this scheme will be higher than the current rates. There are 2,000,000 tons more than can be used in the ore traffic and it will be necessary to fall back on the grain and other lines. The result will be to force down the grain rate, which was high because so much tonnage had gone, it was supposed, into the ore traffic. This will, in turn, lower the ore rate and possibly cut so deep that Rockefeller will be paying more for boats than those who made no season charters.

MONTANA.

Development work is progressing rapidly in the big copper district in northern Lewis and Clarke counties. Captain O. A. Palmer is in the section representing Eastern capitalists. The copper belt is located on the Big Black Foot river, seventy miles north of Helena and can be traced on the surface for half a mile in width and thirty miles in length. It has a slate foot wall and a granite hanging wall. Assays showing from two to three times the percentage of copper recorded by the leading Butte mines are on record, but the district is badly handicapped by its location at an altitude of 10,000 feet. Snow is on the ground for nine months in the year, rendering transportation both difficult and expensive. There are ways, however, of overcoming the adverse conditions imposed by nature, and a railroad will be built into the district, it is believed.

A big discovery is reported in the vicinity of the Foster Sheep Co.'s premises in Meagher county. Two Finlanders who had been prospecting during the winter with indifferent success came upon a huge boulder of rough, unwashed rock, which proved to be almost pure copper. For a number of years the rock has been used by shepherds as a vantage ground for watching their flocks. The Finlanders when passing it, idly struck it with a pick, and discovered its valuable substance.

It is said in Butte that the recent decision of the Supreme Court, passing upon various injunctions concerning the Snohomish and Tramway mines, the Boston & Montana and the Montana Ore Purchasing Co., is regarded by the Heinze people as very favorable to their side.

The strike on the Great Northern which threatened the Boston & Montana smelting operations at Great Falls was settled on May 7. The railroad claims that it had never intended to reduce wages by the new schedule, and has practically conceded all the demands of the strikers. The men have returned to work, and for one month the company will keep account of the amount of their earnings under the old and new schedules. At the end of that time, the men will be permitted to select the schedule they prefer.

SOUTH DAKOTA.

Dr. Herman Reinbold of Custer has given a contract to Custer men for the mining and delivery of 500 tons of spodumene from the Etta tin mine in Pennington county, east of Hill City. Two years ago Dr. Reinbold found that the spodumene contained enough lithia to give it considerable commercial value in the manufacture of lithia for medicinal purposes. Last year a quantity of the spodumene was shipped to Germany to manufacture into lithia. The ore is worth about $40 a ton on the cars at Custer.

News comes from Deadwood that the shipment of iron ore is likely hereafter to be a regular feature of the mining business in the Black Hills. There is a large iron district on the boundary line separating Custer and Pennington counties, in the center of the district being Iron Mountain. The Burlington Railway runs about four miles from the richest section of the district, and is likely to build a spur to the mine. The Iron Mountain Mining Co., which was organized to operate on Iron Mountain, is now shipping iron ore to Omaha and Denver, where it is used for a flux at the smelters. The ore carries an average of $10 a ton in gold. Another industry which the Iron Mountain Mining Co. contemplates is a paint factory, where it would use the red oxide iron ore. There is now at Custer a similar enterprise.

A large mining estate on Anna Creek has been bought by the Detroit and Deadwood Mining Co. The tract is ten miles west of Deadwood. A cyanide plant will be built this summer which will enable the company to handle 300 tons of ore a day. The ore runs about $12 to the ton in gold.

UTAH.

Mine disasters seldom attain the appalling proportions of the terrible explosion of May 1 at the Pleasant Valley Coal Co.'s mine near Scofield, Utah. The loss of nearly 300 lives is the frightful story of the explosion. While the day shift of nearly 400 men was at work an explosion of great force occurred in No. 4 mine, wrecking that part of the property and spreading quickly to the adjoining No. 1 mine. The force of the explosion blew men and machinery a distance of 200 feet along the gangways, mangling their bodies frightfully. Suffocation caused the death of the victims in No. 1 mine, the flames generating vol-

umes of deadly gases which overcame those who could not quickly reach the surface. The recovery of the bodies was made unusually difficult by the gas and debris, and for some time considerable risk attended the work of the rescuers. Most of the miners were Americans and Welshmen who came from Utah, Colorado and Tennessee, and a majority of them had wives and children.

The wrecked mine was the largest in the State, and had a record of twenty years of profitable working. Its product is of excellent quality, and finds its market along the Rio Grande Western Railroad and elsewhere in Utah, Montana, Idaho and Nevada

It is not probable that the exact cause of the explosion will ever be known, because every witness of the happenings that immediately preceded the accident was killed.

In the R. G. W. group of locations at Homansville, three miles north of Eureka in the Tintic district, ore has been found showing a goodly sprinkling of free gold. The find is considered an important one, and it will produce much interest in this comparatively new district.

J. H. Hoverly of New York has secured claims in the Deep Creek country on which he will begin development work in the near future.

CANADA.

The financial statement of the Granby Consolidated Mining and Smelting Co. of Grand Forks for the year 1899 is before the public. The total assets amount to $1,004,145. The principal items are as follows: Smelter construction, $182,376; railway spur, $30,000; water power construction, $48,357; Carson lands, $26,302; Phoenix property, $21,214; mining department, $21,772; mining development, $25,227; mines and mineral claims, $495,738; treasury stock, unsold, $100,000; Phoenix lots, sold, $100,000. The total capitalization is $900,000 in 25 cent shares, which are now selling on the market at a premium of 100 per cent. The unsold treasury stock will probably be divided pro rata among the shareholders.

Mining engineers have recently been investigating the property of the Rambler-Cariboo, and it is thought that they are representing several promient capitalists who contemplate taking a controlling interest in this property.

The Rathmullen Consolidated Mining & Development Co. has held its annual meeting at Rossland. The treasurer's report shows that $19,722 was spent in development in the year just closed. The company has acquired a complete mining plant consisting of a 45-HP. boiler, one double-cylinder hoist, one standard compressor and receiver, machine drills, sinking pump and blasting battery. Over 675 feet of development work has been done on the Maple Leaf claim, and the company is now sinking a winze at the sixty-six foot level. In ore it runs high in values.

The Slocan district claims to be ahead of all other mining camps in British Columbia from the standpoint of values produced. Since the year opened, 2,340 tons of silver-lead have passed through the port of Kaiso alone.

David E. Grover of Atlin has been in Seattle on mining business. He says that British Columbia mining camps are already feeling the effect of the repealing of the placer mining laws of the Province. "When Atlin was first discovered to be gold-bearing," he says, "American miners flocked there and were just on the eve of making a success on the placer fields when Canadians and Englishmen saw visions of untold wealth and decided to run the country themselves. The result is well known. Within three months after the passage of the Alien law, the country was deserted by mining men, and claims that American push and energy would have turned into paying mines were abandoned. If the Atlin district has been known as a failure, it was only because of the legislation passed in January, 1899. We now expect to have a large population there, and it will be composed of practical mining men. The Alien law was repealed at this time for the purpose of inducing many of the men who had intended to go to Nome to enter British Columbia."

MEXICO.

The Mexican government has made public a record of the opening of new mines in Mexico in January, compiled by Senor Salvador Echagaray. According to this report, there were registered 1,318 new mines, with an area of claims of 16,398 hectares of ground. Of these seventy-four were gold mines, 312 gold and silver, 112 gold, silver, and lead, and 120 gold, silver, and copper. There were 116 silver mines, 314 silver and lead, sixty-one silver and copper, and seventy-six copper. In connection with these figures the Mexican Trade Review brings out some very suggestive facts, namely, that the State of Chihuahua registered the largest number—315. Sonora followed with 205, and Guerrero was third, with seventy-five. The Review says further: "When it is considered that Guerrero is undoubtedly a much richer state minerally than Chihuahua, and that Chiapas is unquestionably next after Guerrero, and in the opinions of some persons supposed to know, fully equal to Guerrero, and also that Chiapas has only one mine registered during January, the inference seems almost too plain to mention. It is American capital which is investing in Mexican mines, with the probable exception of the Rothschilds, and unless British capital makes haste to get interests in Mexico soon, they will be the day after the fair. There can be no doubt that while all this activity in opening new mines is going on, that it will be some time before there is any danger that there will be any lack of opportunities for profitable and safe investment in this country. The fact that the proximity of Chihuahua and Sonora to the United States has resulted in large American interests, and that the American interests are more the result of absorption than any broad and general knowledge and familiarity with the country, should call the attention of British capitalists to the fact that there are great opportunities here for investments. In England there is a most deplorable general ignorance and misconception about Mexico, so many people of means supposing it to be in South America, and knowing so little of actual conditions, and in so many instances, having utterly unfounded ideas of the Republic. In this connection is might be well to call attention to the fact that there are in the state of Sonora 317 gold mines. Not only this, but there are 358 mines of gold and silver, and three of gold, silver and lead, or a total of 675 mines where gold separately or in connection with other minerals exists. This report is for the month of January of this year, but there seems to have been just as much activity during the month of February."

The Picacho de Bacanuchi mine, near Bacanuchi, in the Arizpe district, Sonora, has been bought for $150,000 in gold by Thomas McGraw, of New York, who will erect a mill, put in modern machinery, and develop the property thoroughly.

An American company has bought the Silveragoa mines, in Sinaloa, for $50,000, and will begin active development at once.

IRON AND STEEL

UNION ORE CO: This is the name of the company formed by the American Steel Hoop Co. and the Republic Iron & Steel Co. It has leased forty acres of the best ore land near Virginia, Minn., in the Mesba range, near the large holdings of the Oliver Mining Co. The land was secured for $200,000.

WHO MAKES THE BEST ENGINES? The Japanese have become firmly convinced that the British engine is the best, according to the "London Mining Journal." Formerly orders for numbers of engines were sent to the United States by the Japanese. The American manufacturers were prepared to sell at two-thirds of the cost of the British engines and to promise delivery in one-third of the time. Now, however, it is asserted, the United States has plenty of work, prices have been raised, and the same promptness of delivery is not offered.

WIRE-ROD PRODUCTION in 1899: Figures have been prepared by the American Iron and Steel Association, showing that the production of iron and steel wire rods in this country amounted in 1899 to 1,099,376 gross tons, against 1,071,683 tons in 1898, and 970,736 tons in 1897. The increase in 1899 over 1897 was 13 per cent. Last year Pennsylvania made the largest quantity, with Ohio second, Illinois third, and Massachusetts fourth. Quantities of the finer grades of iron and steel wire rods are still imported. The exports were 16,992 tons in 1899 and 18,510 tons in 1898.

BUSINESS PROFITS OF KRUPP: The Frankfurter Zeitung, of March 22, 1900, contains a statement made by a competitor of Krupp with reference to the profits made by Krupp in his contracts with the German Government. He says that some time ago Krupp furnished field guns at $1,145 each. Competitors afterwards received an order for the same kind for $464.30 each. Thereupon Krupp reduced his price from $1,145 to $452.38. For shrapnels, Krupp received $2.03; his competitors furnished them at $1.19. It is an error to say that Krupp alone can furnish nickel plates for the navy. The process of manufacture is no secret, but is known by every intelligent manufacturer. If there were competition, the nickel plates could be obtained at half the price paid to Krupp. The navy department, however, prescribes conditions which make competition impossible. Testing grounds are required of the same dimensions as those of Krupp, which belong to the Government and have been rented to him. The necessary provisions for testing 24-centimeter guns would cost between $500,000 and $750,000; for 15-centimeter guns, $75,000. Without previous assurances on the part of the Government, nobody would risk such an investment.

AMERICAN SHEET STEEL CO.: This new organization has begun its career with a declaration of policy and principles which is somewhat unique in the literature of "trusts." The company will have its offices in the Battery Park Building, New York. It now has possession of nearly all the establishments in the United States manufacturing light sheets. Several mills in the East which are operated independently manifest no antagonism to the combination. The company proposes to establish pleasant relations with all interests handling or consuming sheet iron and steel. Its policy will be to maintain prices at a point which will yield a reasonable manufacturing profit. The managers, according to their declaration, do not propose to fix purely arbitrary prices, calculated to extract from the trade as high rates as it is possible to charge, but to take actual cost of materials, labor and incidentals, and base their selling price on a fair return on such costs and the risks of business. They have, therefore, decided to maintain prices at about the rates which have recently prevailed. These prices have in conspicuous instances been actually below the cost of production at some of the mills now embraced in the consolidation. It is not their intention to advance prices unless the cost of material should make this absolutely necessary.

The company will protect legitimate distributors who actually carry stock, and will avoid brokers and commission houses, except those engaged in the export trade. It will not antagonize manufactures of specialties produced from sheets, and its trade will be conducted in such a manner as to protect all its customers. The export trade will be a feature of its business.

COAL AND COKE

"KLONDIKE" COKE: The Bessemer Coke Co. has the distinction of being the first maker of coke in the section of the Connellsville region which has been termed the "Klondike District." This company has a plant for a block of 250 ovens, almost 100 of which are complete and waiting for connections with the Southwest Pennsylvania Railroad. Analyses of the company's coke show it to be uniform in character and superior in some respects to the coke made in any of the other districts of the Connellsville region.

ENGLAND STILL IN THE COAL BUSINESS Americans who read the figures showing their country's increasing prominence in the coal trade of the world, must not be misled into believing that the importance of England in the same field is diminishing. This is brought out by the "Colliery Guardian," in a leading editorial in a recent issue. "In the present prosperous state of the coal trade," it says, "with our current immense output, colliery proprietors and mining engineers will be prepared to hear of all sorts of projects for the restriction of our present coal use. True, our output is very large, and we send abroad as much as 41,000,000 tons, but there is to be put over against these the other facts that we are continually discovering new coal deposits and that new coalfields are being opened up in districts where beforetime the presence of the black diamonds had been rather suspected than absolutely known. What amounts to almost a revelation of ungotten coal is the news just received, for instance, of mining enterprise in the North Warwickshire coal field. The deposits in this part of the kingdom have been described by experts as constituting the largest undeveloped coal-bearing area in Great Britain, and the mining industry in the central county of England may almost be said to be in its infancy.

No Strike in Pittsburg.

An agreement was reached at Pittsburg on May 3 between the coal miners and employers which, it is believed, will shut off the possibility of a strike for the year at least. The settlement provides for a straight 20 per cent advance to

the outside day laborers, based on the wages they received last year. At the final conference, the following motion, made by President John Mitchell of the United Mine Workers, was seconded by F. L. Robbins, Chairman of the Pittsburg Coal Co., and passed unanimously:

"That, based on an eight-hour work day, the following classes of labor be advanced 20 per cent on the prices paid prior to April 1, 1900: Trimmers, dumpers, pushers, car-oilers, slack-haulers, checkmen, bit grinders, couplers, cagers on top, droppers-in and droppers-out of railroad cars, the maximum to be $2.25 per day."

NEW INCORPORATIONS

The name, address and capital stock of corporations recently announced, and the name of one incorporator. Unless otherwise specified, companies are organized to conduct a mining business. Address of the incorporator named is same as that of company, except when stated otherwise.

CALIFORNIA.

SURE SHOT OIL CO., Los Angeles; $150,000; W. F. Fitzgerald.

MUSTAVIT OIL CO., Visalia; $225,000; J. Wilzniski.

UNION JACK OIL CO., Los Angeles; $1,000,000; A. J. McCall.

CROWN KING OIL CO., Los Angeles; $300,000; H. W. Brodbeck.

WHITE SWAN MINES CO., San Francisco; $1,250,000; S. Balliet, Truckee.

KERN CANON OIL CO., Fresno; Develop and improve oil lands; $200,000; J. W. Briscoe, Mologo

KIRKWOOD GOLD MINING CO., Jackson; $150,000; J. E. Dye.

MORNINGSIDE OIL CO., Los Angeles; $500,000; D. P. Hatch.

STAR WANO MINING & MILLING CO., Corona; $250,000; H. C. Foster.

LONDON OIL CO., San Francisco; $700,000; W. H. Malott.

EXETER OIL CO., Exeter; $200,000; T. W. Newman.

ORANGE CENTER OIL CO., Lindsey; $200,000; L. S. Wingrove.

WESTERN GOLD MINING CO., San Francisco; $400,000; G. Bayha, Cologne, Germany.

PIEDMONT GOLD MINING CO., San Francisco; $1,000,000; T. J. Ryan.

ORYNSKI MINING CO., San Francisco; $100,000; L. Orynski.

CULVER BEAR MINING CO., San Francisco; $100,000; J. O. Culver, Palo Alto.

LONE STAR OIL CO., Bakersfield; $500,000; J. B. Batz.

SUPERIOR OIL CO., Bakersfield; $500,000; R. S. Aston.

SOLOMON RIVER MINING CO., Stockton; $100,000; P. H. Boggs.

INTERNATIONAL MINING & DEVELOPMENT CO. OF THE UNITED STATES & MEXICO.; $10,000; T. Ellis, Jr., Alameda, Cal.

CANFIELD OIL CO., Bakersfield; $500,000; C. A. Canfield, Coalinga.

DOHENY OIL CO., Bakersfield; $500,000; C. A. Canfield, Coalinga.

CHANSLOR OIL CO., Bakersfield; deal in mineral lands; $500,000; C. A. Canfield, Coalinga.

TADPOLE CONSOLIDATED GOLD MINING CO., Sacramento; $20,000; F. Eckhart.

MADEIRA WRIGHT GRAVEL MINING CO., San Francisco; $500,000; J. F. Forderer, Alameda.

ELAINE OIL CO., Oakdale; $200,000; J. Haslacher.

SANTA CLARA OIL CO., Stockton; $40,000; F. Gattrell.

LADY BRYAN DEVELOPMENT CO., Hanford; $120,000; B. B. McGinnis.

GRAYSON OIL & LAND CO., Modesto; $250,000; J. Johnson.

BAKERSFIELD BORATE CO., Bakersfield; mine for borax, etc.; $10,000; D. E. Josephi.

FOX RIVER EXPLORATION & MINING CO., Sacramento; $200,000; A. C. Hinkson.

COLORADO.

MINERS' CO-OPERATIVE SAMPLING & ORE CO., Cripple Creek; $50,000; E. M. LaMont.

SURVEYORS' CAPE NOME MINING & MILLING CO., Denver; $1,320; W. Harris.

NEW LEADVILLE MINING CO., Leadville; $1,250,000; G. H. F. Meyer.

MECCA GOLD MINING CO., Buffalo, N. Y.; $4,800. E. C Lindermann.

CRIPPLE CREEK BONDING, LEASING & MINING CO., Cripple Creek; $50,000; A. G. Barton.

HILL HOUSE MINING & MILLING CO., Denver; $500,000; F. A. Smith.

GLOBE OIL CO., Florence; oil business; $600,000; H. J. Brown.

IOWA.

JOHANNA GOLD MINING CO., Council Bluffs; $325,000; C. E. Palmer.

MAHASKA COAL & MINING CO., Oskaloosa; $1 000; W. J. Neagle.

COURTLAIN MINING & MILLING CO., Des Moines; $100,000; T. W. Henry.

CARBONDALE COAL & MINING CO., Des Moines; $25,000; W. F. Wycoff.

MAINE.

WASHBURNE WIRE CO., Portland; manufacturing and dealing in iron and steel products; $1,500,000; L. A. Ford, Beverly, Mass.

MINNESOTA.

SHARON ORE CO., St. Louis County; $200,000; M. C. Mackinnon, Duluth.

MISSOURI.

WEST ALBA MINING CO., Webb City; $100,000; W. G. Bryant, Carterville.

MEXICO MINING CO., Mexico, Mo.; $15,000; S. M. Locke

NEW JERSEY.

JEANNETTE MILLING CO., East Orange; $125,000; A. E. Knowlton.

AMERICAN PLACER CO., East Orange; $140,000; M. H. Picking.

NEW YORK.

INDIAN TRAIL MINING CO., Buffalo; $150,000; H. H. Persons, East Aurora.

BANKS MINING CO., New York City; $20,000; H. E. Bowen, Richmond Hill.

OHIO.

CLEVELAND & TUSCARANAS COAL CO., Cleveland; $30,000; D. S. Dowers.

OREGON.

EXCHEQUER GOLD MINING CO., Sumpter; $75,000; S. H. Bell.

SUMMIT GOLD MINING & DEVELOPMENT CO., Baker City; $100,000; W. Eblen.

BUFFALO GOLD MINING CO., Sumpter; $100,000; F. A. Williamson.

PENNSYLVANIA.

SENECA COAL CO., Philadelphia; $100,000; F. T. Patterson.

SILVERTON COAL CO., Pottsville; $40,000; J. M. Stauffer, Beaver Meadows.

RHODE ISLAND.

PLYMOUTH ROCK MINING CO., Providence; $100,000; O. A. Newell, Central Falls.

WASHINGTON.

MONARCH MINING & SMELTING CO., Seattle; $10,000; J. McMullan.

GRIBBELL ISLAND COPPER CO., Fairhaven; $100,000; W. J. Hughes.

MINGO MINING & MILLING CO., Spokane; $50,000; S. S. Glidden.

NEWTON COPPER MINING CO., Spokane; $100,000; W. F. Newton.

ELDORADO QUARTZ MINING CO., Seattle; $1,000,000; T. W. Roach.

CLOVER LEAF MINING & MILLING CO., Spokane; $75,000; M. Johnson.

HIGHLAND COMSTOCK MINING CO., Spokane; $125,000; D. E. McVay.

WEST VIRGINIA.

ESTERLY CANTILEVER DREDGING & MINING CO., Washington, D. C.; $1,500,000; G. W. Esterly.

WYOMING.

EXCELSIOR MINING CO., Cheyenne; $80,000; C. J. S. Hoover, Denver.

ELIZABETH MINING CO., Cheyenne; $1,000,000; F. M. Hoyt, Milwaukee.

HIDDEN TREASURE MINING & TUNNEL SITE CO., Lincoln; $1,000,000; W. H. Dorgan.

DIVIDENDS DECLARED

At the next monthly meeting of the Quincy Mining Co. the directors are expected to make the semi-annual dividend rate $5 regularly with extra dividends according to circumstances from time to time. Last year the company earned $13.50 a share and paid $11 in dividends.

The Montana Ore Purchasing Co. has declared a regularly quarterly dividend of $1 a share ($80,000), payable May 12.

The Boston & Montana Consolidated Copper & Silver Mining Co. has declared a regular quarterly dividend of $5 a share, and $5 a share extra, payable May 29. This is the largest single dividend ever declared by the company, calling for a disbursement of $1,500,000. The total dividends declared amount to $17,225,000.

The Standard Oil Co. has declared a dividend of $10 a share, payable June 15.

The New York, Honduras & Rosario Mining Co. has declared a dividend of 10 cents a share, payable May 12. The total amount issued in dividends by this company to date is $1,235,000.

The Central Lead Co. of Missouri announces a dividend of 50 cents a share, payable May 15. The total payment is $5,000.

A quarterly dividend of $1.50 a share will be paid by the Pressed Steel Car Co.

On May 2 the New York Zinc Co. paid a monthly dividend of 25 cents a share, amounting in all to $7,000. This makes a total of $56,000 disbursed by the company.

On May 15 the Bullion Beck pays a monthly dividend of 10 cents a share, amounting to $10,000. The total amount distributed to the stockholders of this company to date is $2,488,400.

A monthly dividend of 5 cents a share, payable May 10, is announced by the Swansea Mining Co. of Utah.

THE METAL MARKETS

The following quotations are those current in New York City, unless otherwise stated, at the time we go to press—usually two days before the date of publication. We take particular pains to obtain trustworthy figures.—The Mining and Metallurgical Journal.

SILVER: For a few days the bullion market displayed unwonted activity and strength. Special orders appeared in London, presumably for the English Mint, and some Continental buying was also noted. After these orders were executed the price was inclined to sag, though no real weakness developed. The commercial price of bar silver may now be placed at 59⅞. Mexican silver dollars are quoted at 47½.

COPPER: No further advance in copper has occurred since our last issue, and in fact a slight change of sentiment is noticeable among traders. Considerable business is going on quietly without much debate as to prices. Buyers feel less anxious than they did a short time ago, but they realize that they cannot require concessions in the face of the strong foreign demand. Sellers, on the other hand, seem satisfied to let well enough alone, and pocket complacently the huge profits involved in current quotations. About 17c. may still be regarded as the price for Lake.

MINOR METALS: The lead market has been distinctly dull, with quotations inclined to drop: 4.40@4.45c. was the closing price. Spelter has been decidedly weak, notwithstanding heavy absorptions of the metal in foreign markets; 4.57@4.62c. may be deemed the ruling price. Tin at one time developed considerable strength, advancing to 30½c., but the demand was shortlived, and the price sagged off to 29¼c. for spot.

IRON AND STEEL: Numberless theories have been expounded at wearisome length to account for the present situation in the iron market, but, sifted down to essentials, the facts in the case are few and easy to understand. Prices will not go up indefinitely because two powerful restraining forces are constantly at work to depress them—(a), the eagerness of producers to take advantage of the market and enlarge their output; (b), the increasing reluctance of buyers to pay the higher prices, every addition to the sellers' demands excluding from the market a certain proportion of possible buyers.

All this is sufficiently obvious and elementary, but some of the current theories displace these natural causes with more or less fantastic explanations. The simple fact is that in certain lines iron and steel prices must readjust themselves to the changed attitude of buyers. No startling reductions will be necessary, but some concessions must be made by sellers to keep the enormous machinery of production actively employed. There is an abundance of business in sight the world over that contractors are ready to place at fair prices—at prices, indeed, that would have been deemed abnormally high only a short time ago. Every concession in price will bring into the market new buyers, and there will be orders enough to go round.

COAL AND COKE: General conditions continue encouraging, though seasonable dullness characterizes the ANTHRACITE market. Slight shadings of price have been made, but no indiscriminate cutting has occurred. The Delaware Valley & Kingston Railway project overhangs the situation in a Damoclesian manner, but it is hoped that no great disturbance will result from this complication. $3.65, f. o. b. New York Harbor, is the ruling price for the best quality of stove size.

BITUMINOUS coal is in better supply than it has been for some time past, and prices have taken the usual course under such conditions. The best grades are now obtainable for distinctly less than $3 at New York Harbor points.

Only a short time ago we were quoting COKE at $4.25, but the present price is quite one dollar lower. The output at Connellsville continues very large.

MINING STOCK QUOTATIONS IN VARIOUS MARKETS

Mining stocks multiply incessantly, and we cannot undertake to record them all. We keep, however, complete records of all mining stocks, wherever listed, and we shall be glad to furnish any subscriber, on request, with detailed information about quotations. The prices given below are in most cases those current at the close of business on the day we go to press—two days before the date of issue.—*Mining and Metallurgical Journal*

BOSTON.

Adventure	4 75	Old Colony Cop	3 50
Allouez	1 75	Old Dominion	17 00
Anaconda	43 75	Osceola	60 50
Arcadian	18 50	Parrot	41 25
Arnold	5 75	Quincy	130 50
Atlantic	24 00	Rhode Island	1 50
Baltic	19 25	Santa Fe	5 25
Bingham	10 50	Santa Ysabel	1 25
Bonanza		Tamarack	182 50
Boston & Mont	290 00	Tecumseh	1 00
Butte & Boston	69 00	Tri-Mountain	8 75
Cal'met&Hecla	755 00	Victoria	1 00
Centennial	17 25	United States	8 25
Cochiti	11 00	Utah Con	28 00
Copper Range	22 00	Washington	1 00
Dominion Coal	42 50	White Knob	17 00
Franklin	14 00	Winona	3 00
Isle Royal	20 00	Wolverine	38 50
Merced	0 50	Wyandotte	2 50
Mohawk	11 50	Zinc	14 00

NEW YORK

Adams Con	18	Golden Fleece	30
Alamo	14	Gould&Curry	12
Alice	48	Hale& Norcr'ss	25
Amalgama'd	87 50	Horn Silver	1 25
Anaconda C	43 75	Iron Silver	68
Anaconda G	33	Isabella	1 23
Argentum	19	Jack Pot	63
Best & Belcher	24	Julia Consol.	
Breece		King & Pemb	—
Brit Col	10 75	La Crosse	14
Brunswick	25	Leadville	06
Caledonia	—	Little Chief	18
Catalpa	—	Mexican	21
Chollar	17	Mollie Gibson	24
Chrysolite	05	Moulton	25
Com T stock	03	Mount Rosa	70
Com. T bonds	02½	Occidental	05
Com T script	05	Ontario	7 75
Con Cal & Va	1 40	Ophir	42
Cr & Cr Creek	—	Pharmacist	14
Crescent	—	Phoenix	08
Cripple CkCon	14½	Pinnacle	21½
Croesus	—	Plymouth	10
Crown Point	10	Portland	2 70
Damon	—	Potosi	15
Deadwood Ter	55	Quicksilver	1 50
Elkton	—	Quicksilver pr.	7 50
Eureka Con	14	Savage	10
Fath De Smet.	07	Sierra Nevada	27
Findlay	15½	Small Hopes	75
Garfield	18½	Specimen	13
Standard	3 25	Utah	—
Tornado	47½	Victor	1 00
Union	40½	Work	33
Union Con	17	Yellow Jacket	12

NEW YORK INDUSTRIAL STOCKS

Amer. Smelt.	41 00	Nat. Lead pf	103 75
Am Smelt. pf	89 50	Press Steel Car	47 50
Am. S. & W	40 [illegible]	Pr'ss St'l Car pf	79 00
Am S. & W pf	80 00	Republic I	15 50
Col F & I	39 00	Republic I pf	57 25
Fed Steel	40 00	Stand. Oil	410 00
Fed Steel pf	68 25	Tenn. C. & I	79 00
Nat. Lead	21 50		

TORONTO

Athabaska	26½	No. Belle	02½
Big Three	05	Olive	21
B. C. G. F'ds	03½	Republic	1 03
Crow's Nest	35 50	Van Anda	03
Dardanelles	02½	Virtue	1 11
Deer Trail No 2	07½	War Eagle	147 00
Fairview	04	Waterloo	—
Golden Star	06	White Bear	02
Knob Hill	70	Winnipeg	12½
Minnehaha			

COLORADO SPRINGS.

Acacia	38	Independence	72½
Alamo	14	Ingham	25
Anaconda	33½	Isabella	1 23½
Anchoria	85	Jack Pot	63
Argentum	20	Keystone	18
Bankers	19½	Lexington	17½
Battle Mount.	30½	Mary Cashen	25½
Blue Bell	12½	Matoa	31½
C C Con	14	Moon-Anchor	04½
C., C. & M.	11	Mount Rosa	79
Columbine	17½	National	08½
Damon	22	Nugget	22½
Dante	15	Ophir	64
Elkton	1 35	Orphan	21
El Paso	42½	Pharmacist	14
Findley	15½	Pinnacle	21½
Garfield	18½	Raven	69
Gibson	24	Rawlings	48
Gold Coin	4 00	Specimen	13
Golden Fleece	35	Temonj	25
Gold King	1 00	Tornado	47½
Gold Knob	17	Union	46½
Gold Sover'gn.	11	Vindicator	1 47½
Gould	41	Work	33½
Hart	17½	Zenobia	19

SALT LAKE

Anchor		Joe Bowers Ex	01
Ajax	51	Low Mam'oth	53
Alice	[illegible]	Little Pittsb'h	01
Bullion Beck	[illegible]	Mammoth	2 21
Cent Eureka	23 25	Mercur	[illegible]
Chloride Point	06	May Day	1 10
Daly	1 00	North Light	06
Daly West	19 00	Omaha	—
Dalton & Lark	03	Ontario	8 50
Delton	—	Petro	—
Dexter	1 01	Rich Anac'nda	09
Dates	00½	Sunshine	10
Eagle	02	Swansea	3 73
Eagle& Blue Bl	97	So Swansea	1 21
Emerald	—	Sunbeam	08
Four Aces	05	Sacramento	22
Geyser Marion	06	Silver King	—
Galena	15	Star Consol	09
Grand Central	5 60	Shower Con	—
Golden Eagle	02	Tetro	—
Horn Silver	1 00	Utah	60
Homestake	08	Valeo	09
Ingot	—	W M't'n Placer	—
Joe Bowers	08½	Yankee Con	—

SPOKANE

Ben Hur	—	Morning Glory	03
Black Tail	15	Mountain Lion	75
Butte & Boston	02	[illegible]	
Deer Trail No 2	06	Princess Maud	07
Golden Harvest	01	Quilp	21
Insurgent	02	Republic	1 00
Jim Blaine	13	Tom Thumb	18
L.PineSur.Con	14½		

SAN FRANCISCO.

Alpha Con	01	Kentucky Con	01
Alta	01	Lady Wash Con	05
Andes	05	Mexican	22
Belcher	10	Occidental	09
Best & Belcher	27	Ophir	47
Bullion	02	Overman	12
Caledonia	80	Potosi	17
Challenge	11	Sag Belcher	02
Chollar	16	Savage	12
Confidence	70	Sierra Nevada	29
Con. Cal. & Va.	1 45	Standard	3 65
Con. Imperial	01	St. Louis	12
Crown Point	09	Syndicate	08
Gould & Curry	14	Union Con	16
Hale &Norcr'ss	27	Utah Con	06
Julia	01	Yellow Jacket	14
Justice	01		

MEXICO

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[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	M[illegible]	[illegible]
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El Oro pref	Guanajuato	—
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